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THE
ARCHITECTURAL
FORUM

IN TWO PARTS

PART ONE
ARCHITECTURAL DESIGN

JANUARY
1929

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The new Sargent Union Lock with demountable knob and exchangeabl cylinder makes an ideal equipment for office buildings

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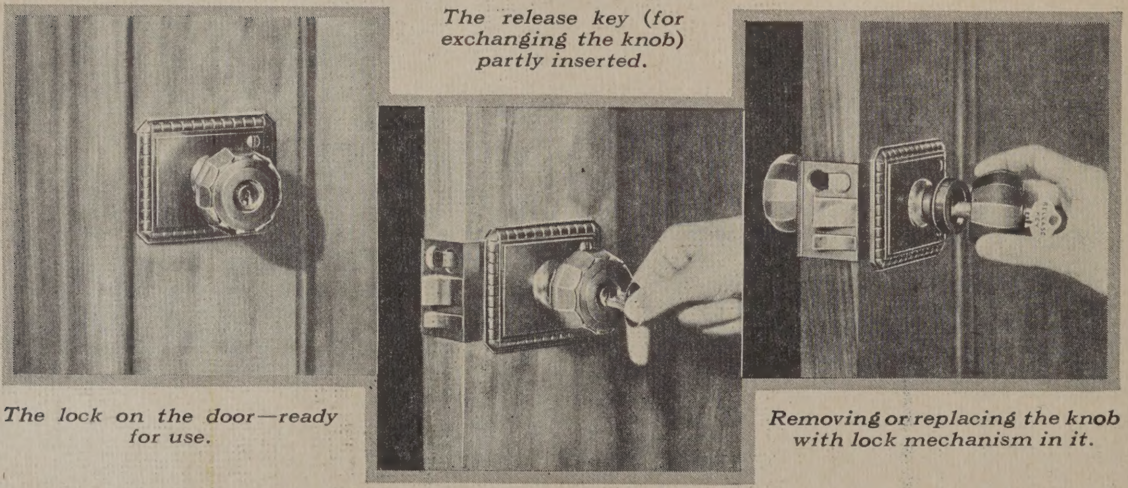

The release key (for exchanging the knob) partly inserted.

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The hardware shown is a proprietary design made for the Fisher Building, Detroit

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SARGENT

LOCKS AND HARDWARE

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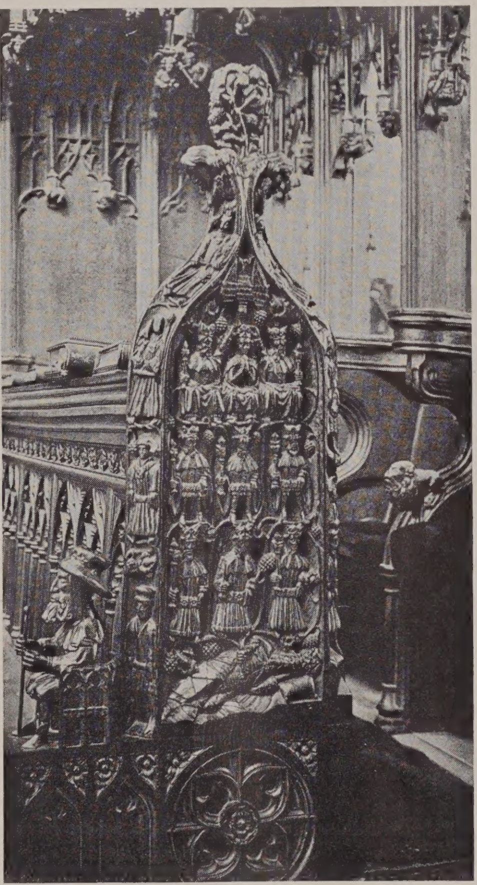
Vol. 50 - 1929

BOOK DEPARTMENT

WOODWORK IN ENGLISH CATHEDRALS AND CHURCHES

A GLANCE AT ITS MEDIÆVAL SPLENDOR

DURING the mediæval era and the Gothic period the parish churches, cathedrals, and conventual structures of England became vast treasure houses of art in every imaginable form. Beauty and religion were inseparable to the minds of mediæval Englishmen, and the wealth along with the piety of the English laid under contribution every resource of art in the way of architecture; carving in alabaster, stone, and wood; glass, stained and painted; metalwork; fabrics, and particularly embroidery and other forms of needlework, this last indeed of such splendor that even today what is known as *opus Anglicanum* is needlework of the highest order. It was an age during which Art served literally as the handmaid of Religion. Much if not all of this matchless legacy might easily have been left to the present-day world. War has worked but little havoc in England, but ruin was wrought when during the sixteenth century the dissolution of the monastic foundations and the spoliation of religion in general brought about the destruction of what generations had created during centuries. The most priceless fabrics were scattered far and wide, often to be used as household ornaments or for personal, secular adornments; carved altars or tomb slabs were utilized as troughs or pavements; what woodwork escaped destruction was used for domestic buildings, and many an old country house in England even today has in its windows glass which was intended not for such use but for religious purposes.



A "Jesse Tree" in Wood Carving. Bench End in Chester Cathedral

In this volume there is produced a new edition of a work which appeared originally in 1917. It covers the period from about 1250 to about 1550, and it consists of a closely detailed study of such woodwork as has been spared by time and vicissitude. The vast extent of the wealth of this kind which once existed may be imagined when, notwithstanding the riches illustrated here, the authors tell us that it represents scarcely one tenth of what was once to be found in the English churches. In the face of widespread destruction, it is marvelous that so much is left for the delight of those who care to seek for it, not only in those well known architectural districts, the West country, and in East Anglia, but in practically every shire. There are few parts of the country which do not possess interesting and beautiful local types of mediæval woodwork. The lively group of timber porches in the south-eastern counties, the grand roofs of Cheshire, the stately screens of Yorkshire, are examples, and the enthusiastic student will find similar remains or beautiful and strongly constructed woodwork almost everywhere. Nevertheless, until recent years it has passed almost unnoticed. The astounding richness of the Devonshire churches in elaborately carved woodwork appears to be known to comparatively few. Vast numbers of visitors see the magnificent screen at Dartmouth, but they are left with the impression that it is an isolated phenomenon, or a relic of some monastery, whereas, beautiful as it is, practically every West country church once had a screen rivaling, or even surpassing it in beauty, and several hundred churches still retain them. Again, thousands of visitors to the East coast are entirely unaware that they are in a district where scores of fine churches are still glorious with mediæval carving and painting, and that this work is among the highest achievements in art that the English race has attained. In Wales the churches are humble and certainly not calculated to catch the eye of the tourist. Very few visitors even enter them, but if by chance they do, they cannot fail to be impressed with the skill and devotion of those mediæval wood carvers who could make even these mean structures glorious and of marvelous charm.

"It cannot be too strongly emphasized that fine woodwork, though now found in comparatively few churches, was one possessed by all. Every church had its pews, its rood loft, its font cover; and there is no reason to suppose that those which have survived have escaped destruction because of their exceptional beauty. Indeed the reverse is far more likely. What is the secret of the charm of mediæval woodwork? In the first place, the ancient craftsmen were gifted with an eye for proportion and a sense of scale which can be properly appreciated only by comparing a work of the middle ages with some effort of a modern craftsman, whose artistic

9606

American Architecture

By

Fiske Kimball

WRITTEN for the layman as well as for the architect, Mr. Kimball presents a survey of American architecture from its first beginnings in the seventeenth century to its latest achievements in the twentieth. Mention of no important detail is omitted, and the carefully prepared text is accompanied by well selected illustrations in half-tone.

262 pages, 5½ x 8½ inches
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Styles of Ornament

By Alexander Speltz, Architect

Translated from the second German edition
By David O'Conor

AN extremely well written and lavishly illustrated handbook for architects, designers, painters, sculptors, wood carvers, chasers, modelers and cabinet makers, and for use in technical schools and libraries, or for private study. 400 full page illustrations, 6 by 9 inches, with illustrated descriptive text.

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senses are blunted by the countless hideous things he sees daily, while his brain is jaded with the conflicting teaching of dozens of false prophets. In the second place, the elements with which they had to deal,—shafts, pinnacles, tracery, canopies, and crestings,—were exceedingly beautiful in themselves. Then again the methods of the mediæval craftsman were human, full of energy, and so devoid of effort. Never having seen the results of slave or machine labor, he had no desire to emulate it. Minute accuracy and exact symmetry were not esteemed as virtues, nor were smoothness and regularity of surface regarded as an end in themselves. If one cares to examine a bit of mediæval tracery, one will generally find the remains of the setting out lines deeply scored into the wood, and a glimpse will be obtained into the actual processes employed. The carving is a true product of the chisel and the gouge, not a reproduction in wood of a clay original model.

"Though the woodworker of the fifteenth century appreciated the value of repetition and was aware of the rich effects which can be produced by the reduplication of the same element, his duplicates are scarcely ever exact. Here he has run against a bad knot, around which the moulding is made to curve; there his tool has slipped, and he has been obliged to modify the design to hide the defect. Where variety is the motive of the design, as in some of the Welsh rood lofts or the later bench ends of Somerset or Suffolk, the fertility of the design is astonishing. The effect is very rarely restless or incongruous, nor does it give the impression that the craftsman is trying to make a display of his skill. Though figure sculpture was not a strong point of the English woodworker, he excelled in the comic element, without which much mediæval carving would be almost too pretty. The value of the grotesque can be appreciated fully only when one contemplates examples of Victorian restorations in which mediæval grotesques, thought by those supersensitive souls to be too coarse for a place of worship, have been superseded by innocuous angels. There is no contrast, and just as it appears to take good and bad men to make a world, so the beautiful and the grotesque must be combined to produce woodwork with the charm of that of the middle ages. Not that mediæval grotesques symbolize evil. Many of them are the most engaging beasties and devils, possessing in a high degree the beauty of extreme ugliness, while many of the most hideous were employed to teach the most moral stories."

The value of this work to architects and designers concerned with church work is great. No one age or period can be said to possess a monoply on design, but the period dealt with here was a time of veritable flowering of art, and such of its glories as yet exist possess a value in that they establish a sort of mark or standard.

ENGLISH CHURCH WOODWORK. By F. E. Howard and F. H. Crossley. Second Edition, 370 pp., 7 x 10¼ ins. Price $13.50. Charles Scribner's Sons, New York.

PERIOD LIGHTING FIXTURES. By Mr. and Mrs. G. Glen Gould. 274 pp., 6 x 9 ins. Price $3.50. Dodd, Mead & Co., New York.

THIS is a small book devoted to a large subject. The authors admit in their introduction the paucity of material to work with, but they cover a long period of time and a variety of types in their discussion and illustrations,—oil, rush and candle as well as the primitive flares of oily wood or hemp. The chapters carry us

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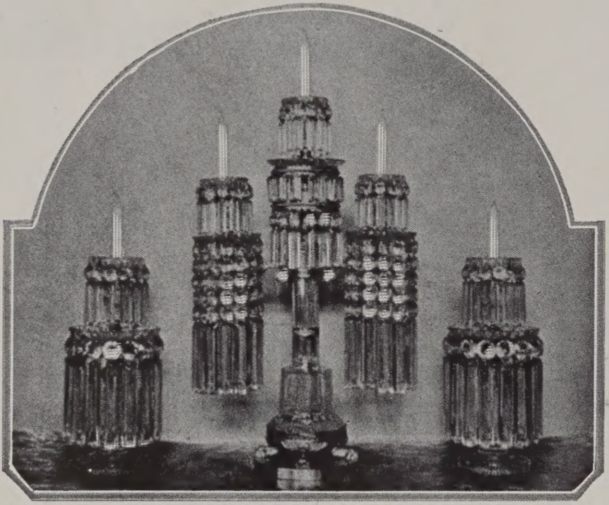

By far the most complete and authoritative work on this important subject, it is a study of lighting fitments of all the historic styles of architecture and decoration. Carefully written by Mr. & Mrs. G. Glen Gould and lavishly illustrated, the volume is a dependable guide in the designing of fixtures for the most severely simple or the most elaborate interior of any kind.

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The Modern English House

An excellent presentation of the different forms being used in modern English domestic architecture,—particularly "small house" architecture. It includes illustrations of exteriors and interiors, and in many instances the floor plans are given. The materials used are wood; half-timber; stone and brick; concrete; stucco over various sorts of masonry or on wood or metal lathing. The volume would be invaluable alike to the architect, builder or home owner or to anyone interested in building.

Text and 192 pages of half-tone illustrations, 8½ x 11 ins. Price $8.50

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through Italy and Spain from the Renaissance; through France and England from the seventeenth to the nineteenth century, and to America of the colonies and the early republic. But one looks in vain for mention of the oil lamps of the mid-eighteenth century which were used so widely in England and America. So far no one seems to have really explained what these lamps were like.

Students of architecture well know the decorative value given to interiors of all periods by appropriate lighting fitments, accessories which are perhaps of greater architectural importance than those of any other nature. Designers, in fact, of all ages since architecture had its first beginnings have lavished what taste and skill they possessed upon the utensils used for providing light; few details of the old Roman palaces or of the villas which have been unearthed at Pompeii are more charming than their tripods and other standards used for just this purpose. Even the little Roman lamps, now to be seen in any museum, made of clay and intended for use of the very poor, are generally given a touch of design which might be regarded as evidence of the potter's appreciation of the lamp's dignity. Architects and their designers have been quick to find for lighting fixtures forms which would agree with and even considerably heighten the effect of the architecture being used,—witness, for example, the richly splendid severity of the Pompeian bronzes already mentioned, and equally characteristic are the gorgeous creations of brilliantly colored glass which the Venetian architects used to light the palaces along their city's canals or the sumptuous chandeliers of ormolu and crystal which somewhat later lighted the splendid palaces of the French kings and nobles.

This volume is the result of considerable study and much research on the part of two students of design and decoration. Added to an intimate knowledge of the demands which architecture makes upon the designers of accessories, there have been exercised rare taste and discrimination in choosing between what might be regarded as degrees of perfection along with knowledge of where the best of its kind is to be found today, and much skill and taste in dealing with the subject matter. The division of the work is first according to countries and then according to periods. Thus in dealing with the succession of architectural styles which followed one another in England, the authors deal with the rather simple, not to say primitive, fitments which obtained in England during the Tudor and Elizabethan days, through with what followed until during the reigns of William and Mary and Queen Anne lighting fixtures (influenced not a little from Holland) reached a high point of excellence which culminated in the great beauty of the fixtures used in the homes of England's rich during the opulent Georgian period, involving much use of the same ormolu and crystal which were being used with such telling effect across the English Channel. The restraint of the Adam era and the fact that its architecture was so largely influenced by discoveries in Italy, led quite naturally to restraint in the matter of accessories.

The illustrations in the book are well chosen and interesting. With a few exceptions they show things which are or have been recently in the hands of dealers. This gives an idea of the variety of old fixtures which are on the market. The reproduction of many of these fitments would be prohibitive in cost today, even if work

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of equal quality were procurable. An outstanding idea which comes to one in the study of this book is the lack of any proper solution in modern times of the problem of electric lighting. In these old fixtures there is generally seen an expression in their design of the means of illumination. Their basic form comes from a frank employment of the illuminating medium, but this basic form is usually contradicted by the adaptation to electricity.

BEYOND ARCHITECTURE. By A. Kingsley Porter. Second Edition, 84 pp., 5½ x 8 ins. Price $1.50. Marshall Jones Company, Boston.

MANY an author finds that when the time has come for a reprinting of his earlier work, there are many alterations necessitated by changes in his point of view, or perhaps because with the passing of time research has developed data which involve considerable change in the formation of premises upon which earlier conclusions were based. Thus, when Professor Porter of Harvard issued a new edition of his well known work, "Beyond Architecture," he wrote in its preface, "When a second edition of this book was called for, I found little which I cared to reprint beyond the title and the first essay. It is partly, no doubt, that I have myself changed; but even more that during a decade much water has flowed under the bridges. What it amused me to say when it was heresy, seems almost commonplace now.

"In place of the omitted portions I have added two new essays. One, 'Stars and Telescopes,' was originally written in French to be delivered as a lecture at the Sorbonne in 1923. However, on second thought I decided it was hardly adapted for that public, so I published it in German. I am indebted to Herr Meiner for permission to reprint it here in English translated from *Kunstwissenschaft der Gegenwart.* I fear no improvement has resulted from this polyglot experience, and the mood now seems far away from me. However the thought is fundamental for the last essay, that has never before appeared, and which I am glad to print. I am therefore offering some new cider, some middling hard, and some turned to vinegar, under a dusty label. I have debated whether it might not be more honest to give the book a new title; but in that case the retention of old matter would not have been understood or forgiven. Moreover, however great the superficial changes, the underlying thought of the first and second editions remains unaltered,—and will probably be as little liked now as it was 12 years ago."

The work is, as ever, a valuable contribution to what might be called the history, philosophy and theory of architecture, and in its new form it presents the views and opinions which added years have brought about.

The subject matter in this new edition of "Beyond Architecture" has been discussed from the scholarly and discriminating point of view which one associates with all of Mr. Porter's writings upon architecture and subjects which are more or less closely related thereto. Architecture all over the world has changed and is changing, and a study of its forms during past centuries and a survey of what is and of what probably will be, gives one an excellent view of the changes which are rapidly taking place in every sphere of life here and abroad.

"The Spanish House for America"

By Rexford Newcomb, University of Illinois

THE undoubted charm of the simpler type of Spanish architecture is due largely to its close relation to the soil. Set close to the ground, and built as a rule of brick, stucco, adobe, or some other material directly of the soil, Spanish domestic buildings have the appearance of belonging in a particular sense to the places where they stand. The simplicity which characterizes their structure is equaled by the simplicity of their design, always given in Spain a direct, naïve quality, which the early Spanish settlers in America secured when they began colonizing and building in Florida, California, and the other regions in America where they were the pioneers. The simple grace and charm of their buildings are being equaled today, and some of the most strikingly successful of recent domestic work owes its excellence to this following.

IN this volume an architect and professor of architecture deals with the most successful adaptation of Spanish domestic architecture in the sunny parts of America where its use is most appropriate. Disregarding the extremely ornate work, where the simplicity of the type is ruined by overelaboration, he presents the American following of the early Spanish style in its most charming aspect. The work deals with the design of the house; its *patio* and general plan; its construction, decoration and furnishing; and one of the most helpful parts of the volume discusses the various forms of craftsmanship which aid in giving the strong character upon which such buildings largely depend. The volume is also helpful because of its including illustrations of the exteriors and interiors of houses built by the architects who are leaders among those successful in use of the Spanish style.

Profusely Illustrated; 164 Pages; 6¾ x 10 inches; Price $3.50

ROGERS & MANSON COMPANY, 383 MADISON AVENUE, NEW YORK

THE EDITOR'S FORUM

COMPETITION FOR AIRPORT DESIGNS

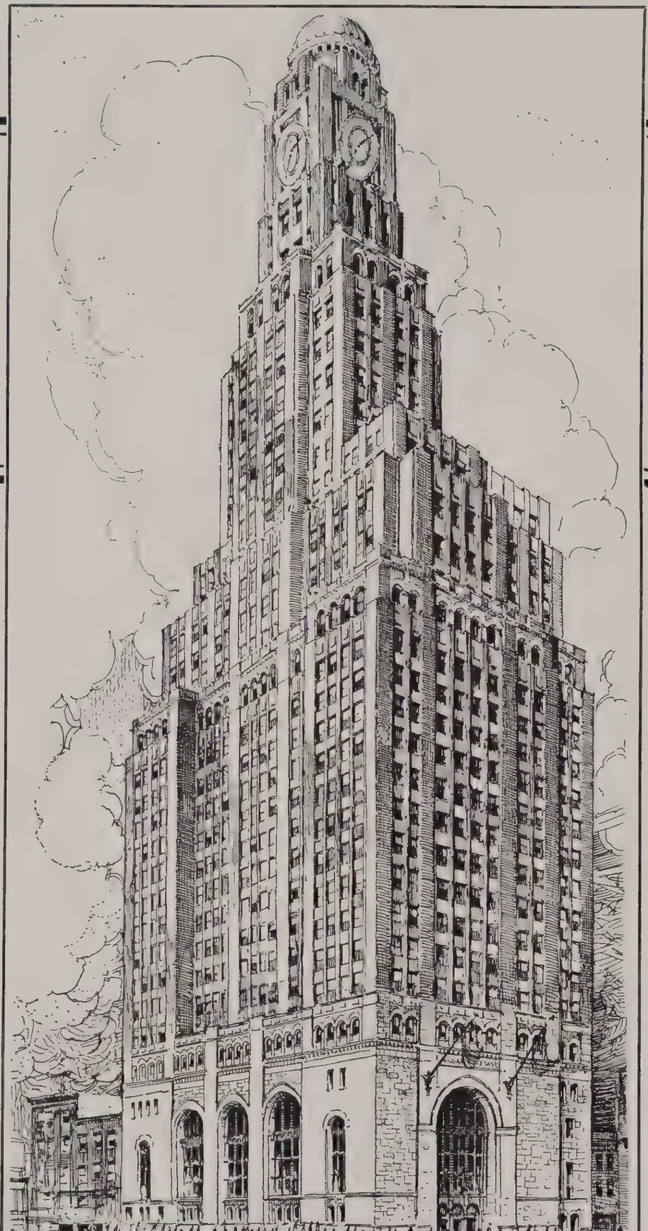
WITH each great advance in modern methods of transportation there develops gradually a call for the services of the architectural profession to create, in attractive and efficient forms, the strucural facilities which are required. The greatest development of this kind is now taking place in the field of aëronautics. Civic and commercial aëronautics must depend for their further development upon the provision of adequate facilities adjoining every important community throughout the nation.

The time has very definitely arrived when attention must be given, not only to the development of landing fields, but to their equipment with permanent, dignified, and efficient structures which are commensurate with the ever-growing importance of civil and commercial aviation as an auxiliary to our present modes of passenger transportation. The architectural profession has had little opportunity to enter this new field in America. Here again a similarity may be noted to the development of railroad terminals, in which the first work was done by pioneer contractors and railroad engineers. Architecture entered the railway field only after the inadequacies of the early terminals and stations had compelled the removal of obsolete structures and their replacement with buildings of vastly greater beauty, dignity, and utility. Unless architecture in its broadest sense is accepted as a factor in the development of modern airports, the costly experience of our railroads will be repeated.

An announcement of great significance to architects was made in the meeting of the Aëronautical Chamber of Commerce in a convention at Chicago during the International Aircrafts Exposition week (December 1 to December 8). This announcement was to the effect that the Lehigh Portland Cement Company is sponsoring a competition among architects and engineers for the designing of permanent airports. This competition has already received the support of leading aëronautical organizations and individuals importantly connected with this field, both in governmental and commercial activities. The purpose of the competition is to focus the attention of the public, city officials, and architects and engineers on the need of well designed airports and their buildings appropriate for these modern transportation gateways to our American cities. THE ARCHITECTURAL FORUM has been asked to represent the interests of the architectural profession in the formulation of the competition program and in the dissemination of information concerning the competition requirements. Well known architects have indicated their interest in this competition and their willingness to coöperate in making certain that it will be conducted in a proper professional manner and one which will provide the greatest value in contributing to the scientific development of air transportation of all kinds. Harvey Wiley Corbett has accepted the position of chairman of the Jury of Awards. This jury will probably consist of seven members, three of whom are chosen from the architectural profession because of their interest in this particular subject. In addition to Mr. Corbett, Raymond M. Hood and Professor William A. Boring, Dean of Architecture of Columbia University, have signified their willingness to serve as jurors. Francis Keally, who, in addition to his flying experience during the war, has just returned from a thorough investigation of European airports, has been chosen as architectural adviser. The other four members of the jury will include a leading engineer, a leading expert on city planning and civic development, a representative of the government aëronautic interests, and a nationally known representative of the general aëronautics field.

The manner in which the Lehigh Airports Competition is being organized indicates that its sponsors appreciate its importance, both to architects and engineers, and to the aëronautical industry. The program of the competition is being formulated by a committee of nationally known experts in architectural, engineering, civic and aëronautical fields. The program committee has been charged with the responsibility of establishing requirements which will result in designs of practical and inspirational value to municipalities and air transport companies in the creation and development of airports. The prizes to be offered by the Lehigh Portland Cement Company will be larger than any ever offered in an educational competition and adequate to engage the interest and participation of the leading architectural offices, as well as of all designers and students. The announcement made at Chicago on December 7 was preliminary in its nature, and a period of time has been allowed the program committee for its work before the details of the competition will be announced to architects and engineers early in 1929. It is planned to allow the competition to extend until in the fall.

The Lehigh Airports competition is a timely and significant crystallization of the rapidly growing need for skilled architectural design, coördinated with engineering considerations, in the development of airports. It is felt that the architectural profession will welcome this opportunity to give serious study to the problems arising from the adaptation of aviation to American transportation and travel problems.



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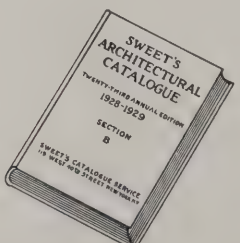
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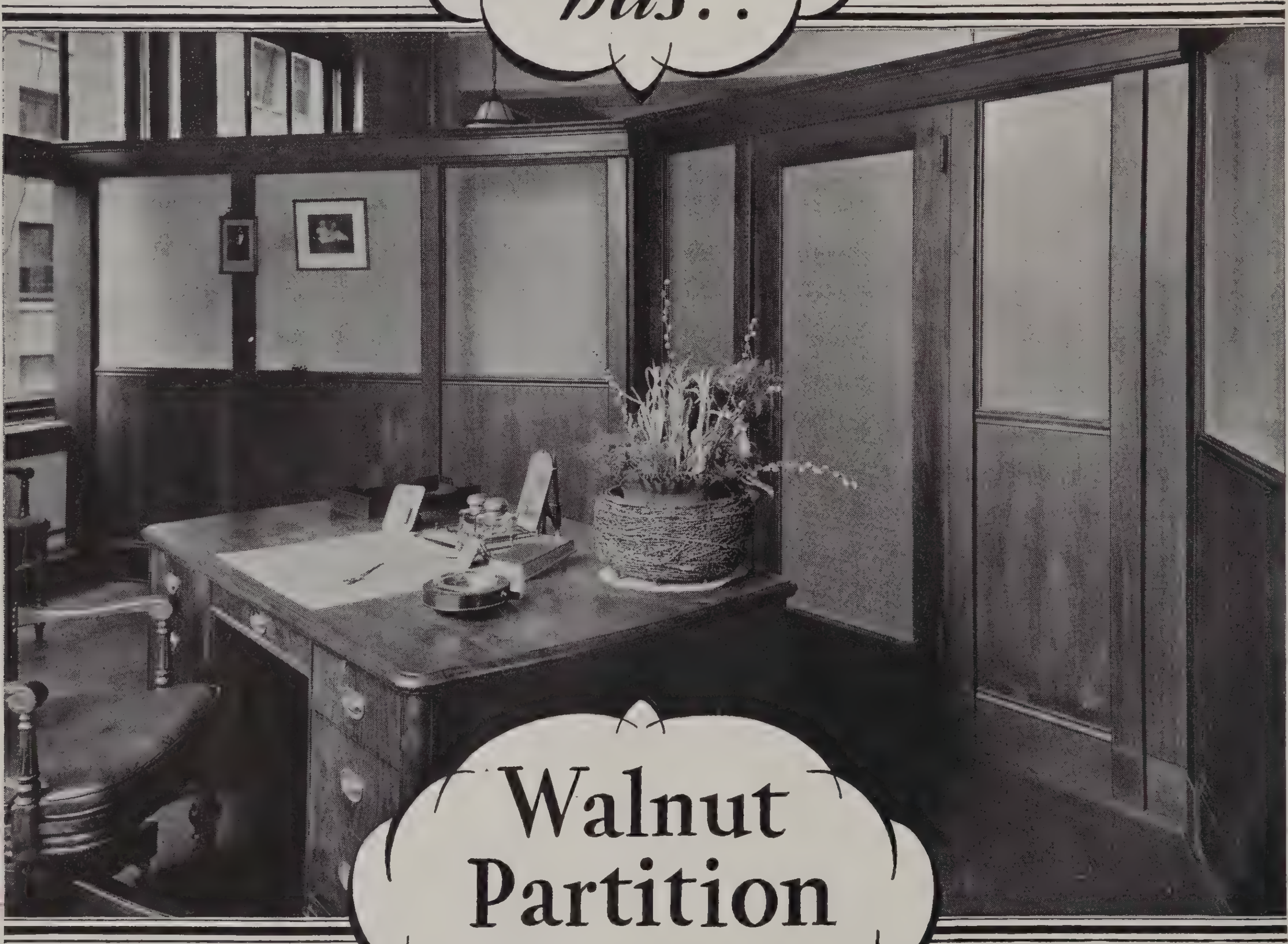
This Walnut Desk *has..*



Walnut Partition *to match*

THREE men have changed the business man's whole attitude towards his office. These three men—the architect, building owner and building manager—have erected for him majestic office buildings . . . . and educated him to demand beauty in his offices.

Witness the modern office illustrated above. It is an executive's office in a textile firm. The desk is beautiful walnut. The chairs are beautiful walnut. The partition—by Telesco—is beautiful walnut. No partition made of any lesser material would do. It is easy to see why painted or stained imitations would not serve the purpose.

This trend towards beauty in offices is a factor with which *you* must reckon. For with the increased use of rich walnut and mahogany office furniture, building managers find it easier to rent offices that offer fine walnut or mahogany partition to harmonize with the furniture.

And now New Telesco *enables* any building to afford these rich woods. Architects have told us New Telesco is the only really beautiful partition made . . . . beautiful because it employs choice walnut, mahogany or quartered oak; beautiful because its modern design is kept simple, to emphasize its incomparable wood beauty. In any office, Telesco harmonizes with the finest office furniture.

Telesco Partition
REG. U.S. PAT. OFF.
IT TELESCOPES

But the beauty of Telesco is more than skin deep. Its special lacquer finish is the longest lasting finish used on any partition. Its telescoping posts make Telesco adjustable to any ceiling height. Its convenient-width sections, as the photograph shows, make it more adaptable. You can take it down, move it around and re-erect it without noise or damage—and with a minimum of labor.

Our modern-art illustrated catalog tells much more completely the unique story of Telesco. May we send you a copy?

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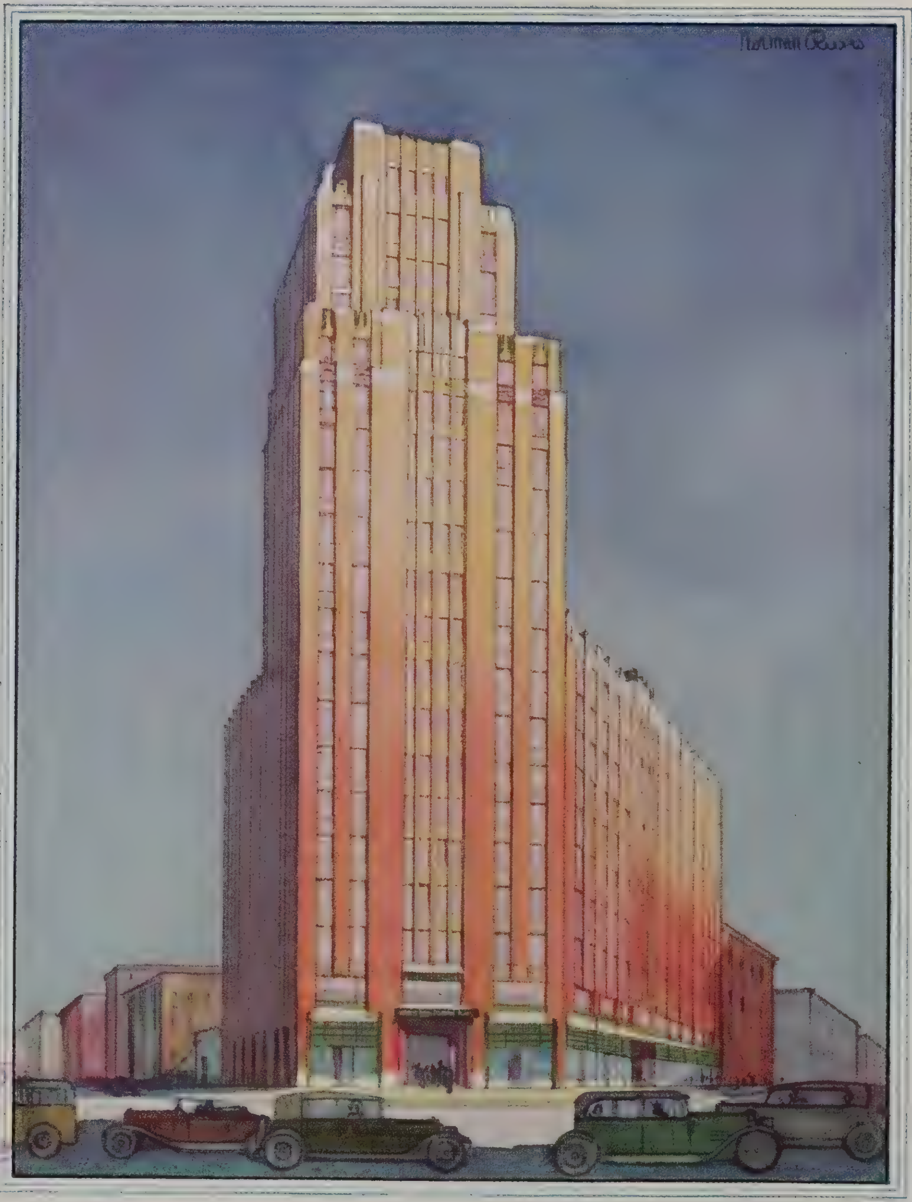


STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, ARCHITECTS

From a Water Color Rendering by Norman Reeves

VOLUME L

THE ARCHITECTURAL FORUM

NUMBER ONE

JANUARY 1929

THE STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, Architects

BY

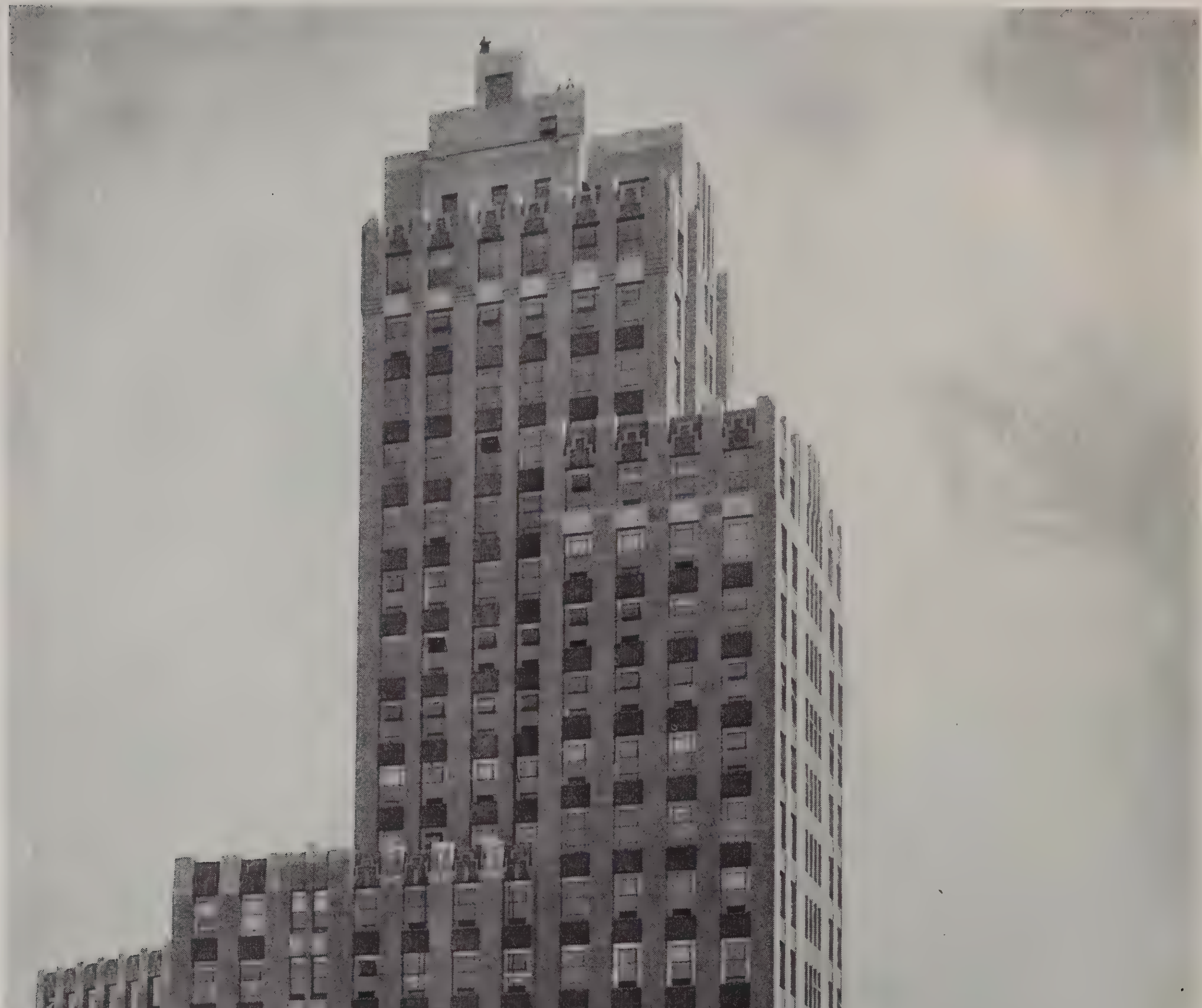
HENRY S. CHURCHILL

THE site of the State Tower Building in Syracuse, formerly known as "the old Bastable site," is one of considerable historical interest. Popular tradition has it that here was one of the principal "long houses" of the Onondagas;—that then as now it was at the crossing of the main trails from east to west and from north to south, and the most important meeting place for the councils of the Five Nations. Today it is the site of the tallest building between New York and Buffalo. The State Tower Building has about 130,000 square feet of office space in ten main stories and a 20-story tower, besides a law library, pent house, and observation platform. The decision to erect so large a building in a city the size of Syracuse was made only after a careful survey of the needs and potentialities of the city. With a plot large enough for the required office area in a low building of uniform height, the tower form was chosen because it provided maximum permanent light for all offices, plus a much needed garage, plus advertising value. Results justified the choice, since two months after completion the building was 80 per cent rented, and almost wholly rented a little later.

Located at the intersection of Genessee, Warren and Water Streets, the ten office stories face on Genessee Street, with the tower rising for ten more on Warren Street, facing Clinton Square, the heart of the city. The service entrance and garage are on Water Street. The plan was largely influenced by the desirability of providing entrances from all three streets, and giving the stores additional display space on the arcade so created. The fire passage at the rear of the Genessee Street stores, required by the state mercantile code, has been decoratively developed as a further feature, thus giving access to all stores from inside the building.

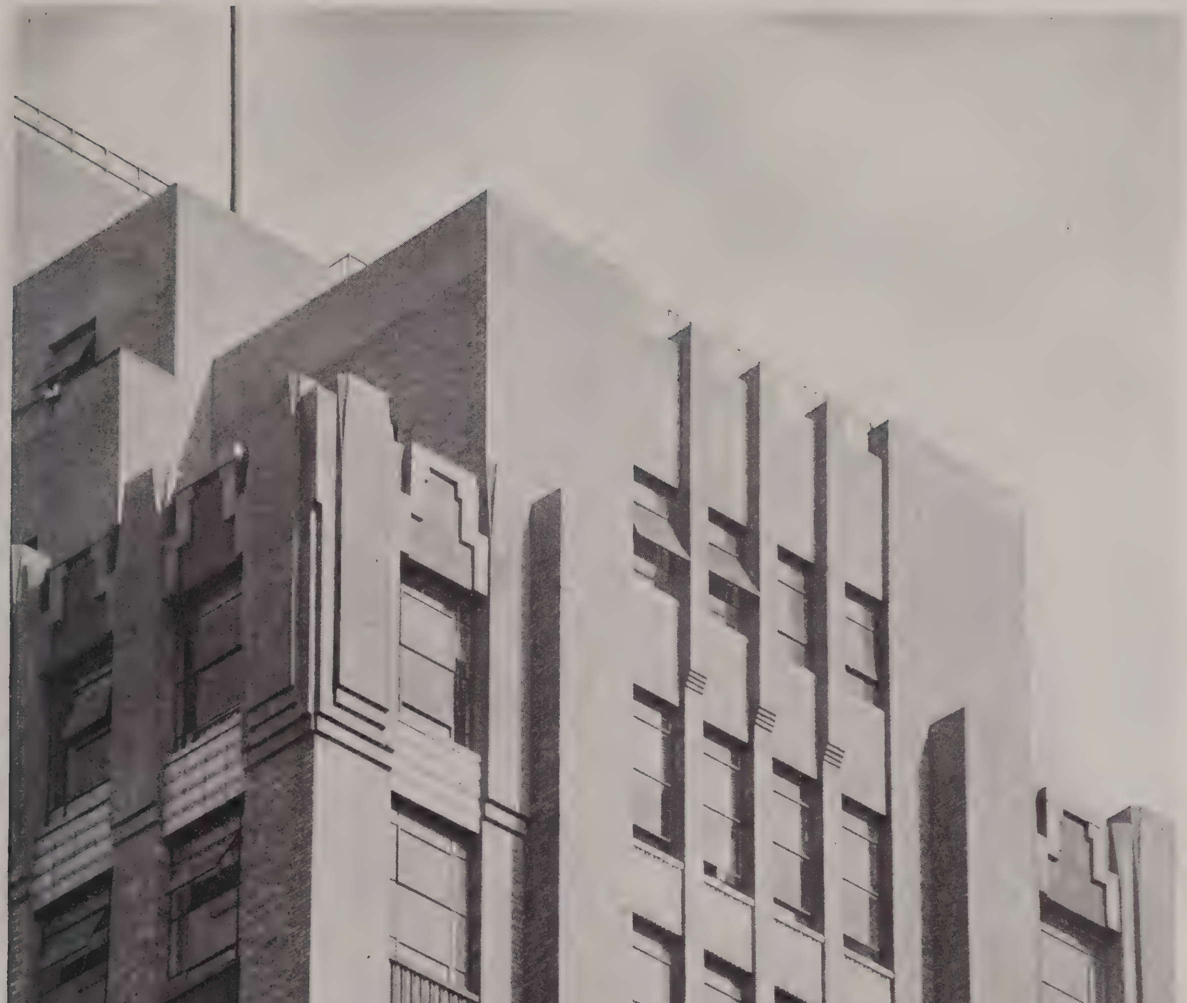
Architecturally, the State Tower was conceived simply as a "modern" building deriving directly from the plan and from its function as an office structure. The most available and simplest materials were used. It was felt, however, that there was no reason why a commercial, highly standardized building should be either extravagantly costly or stupidly ugly; nor, with all the colorful materials now available, why it should be drab. Color is therefore extensively used. Brick, terra cotta, and some cast stone are the principal exterior materials. All windows above the second floor are stock, and only two sizes are used. In an office building the window is the most important element of design, and should serve as the module. In this case a definite rhythmic alternation of windows and piers, conforming to the office divisions, was worked out. Further emphasis was given to this scheme by the dark spandrels, by capping the piers with cast stone, and by stopping alternate piers at different levels. This latter device also provided for the large second floor display windows, and allowed them to be tied in with the store windows below, creating a form that definitely avoids the illusion of "resting on glass" so common to buildings with cantilevered first floor columns. Store and second floor windows are copper kalamein. The store windows are separated by cast iron pilasters that help tie the larger units into the whole design. The basic color scheme is warm tan and brown. The brickwork is graded from dark at the bottom to light at the top, not only because such treatment increases the apparent height, but also because it creates an illusion of sunlight, even on gray days. The spandrels are fluted terra cotta, of a dark chocolate color; sash are painted green. The coping between the piers is a black field with yellow border and orange background. Cast stone is warm limestone color, and was used principally for the sake of its contrasting texture. All colors, except variations of the basic colors, are brilliant and are used in small areas. The result is harmony without dullness.

The main entrances are recessed vestibules. The color scheme is that of the general exterior, but the use of marble and bronze here prepares one for the arcade and the richer treatment of the interior. The entrance frames and portico wainscot are the almost solid red Rosso Antico, with Kasota above the wainscot. The walls of the arcade are also of Kasota to the height of the display windows, and of plaster above. In the elevator lobby the Kasota is carried to the ceiling.

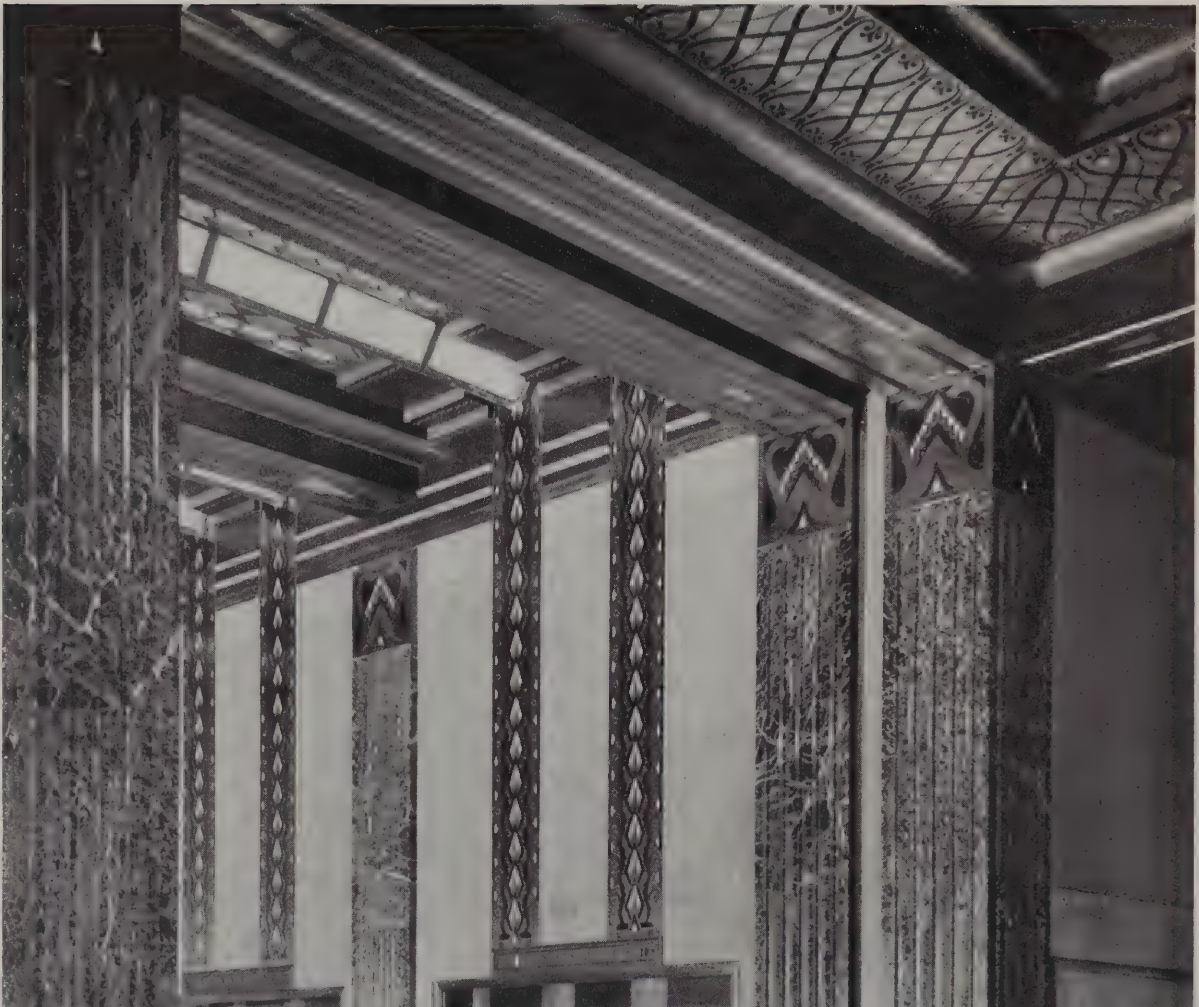


Photos. Sigurd Fischer

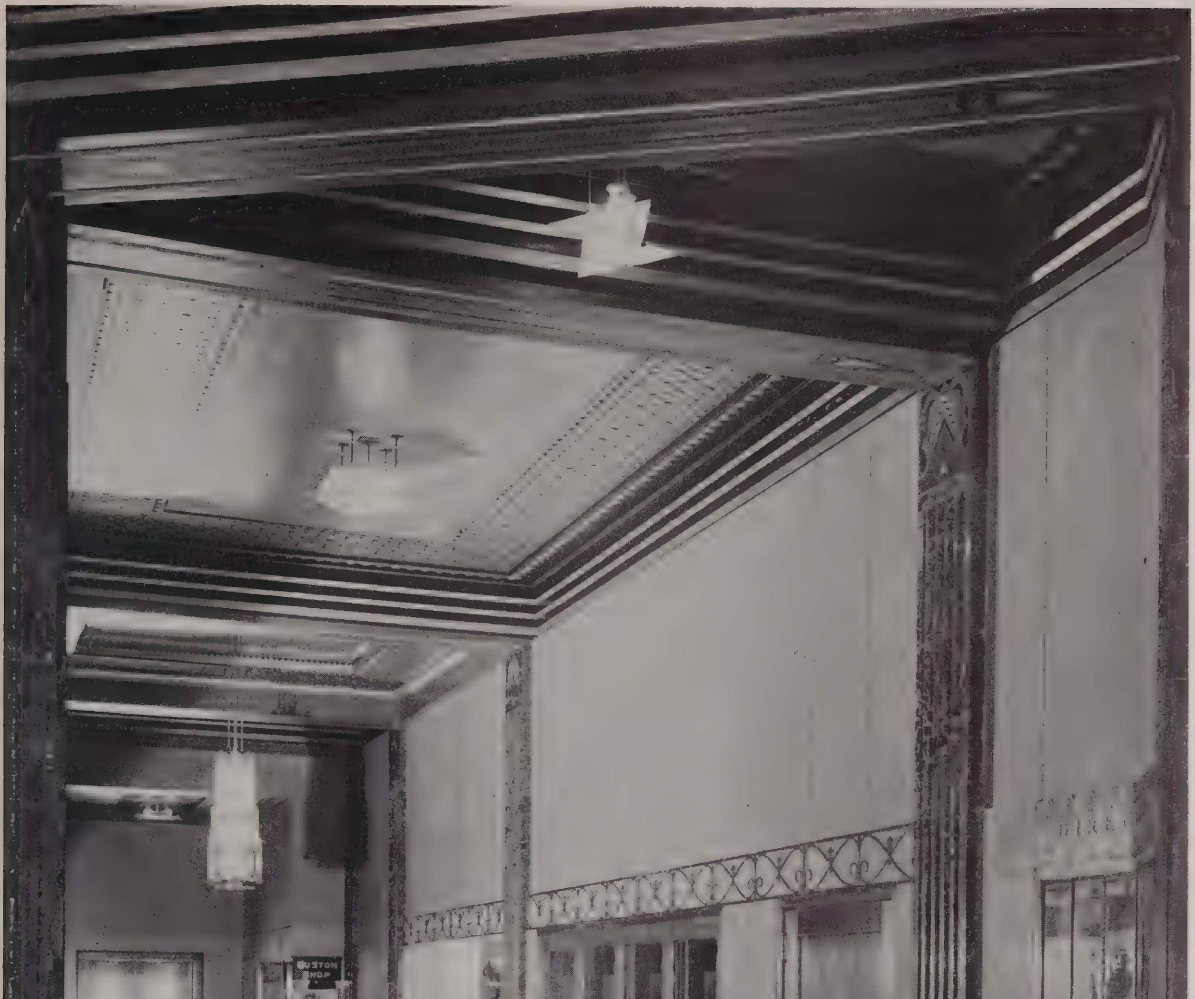
STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



ELEVATOR LOBBY
STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



ENTRANCE HALL
STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS

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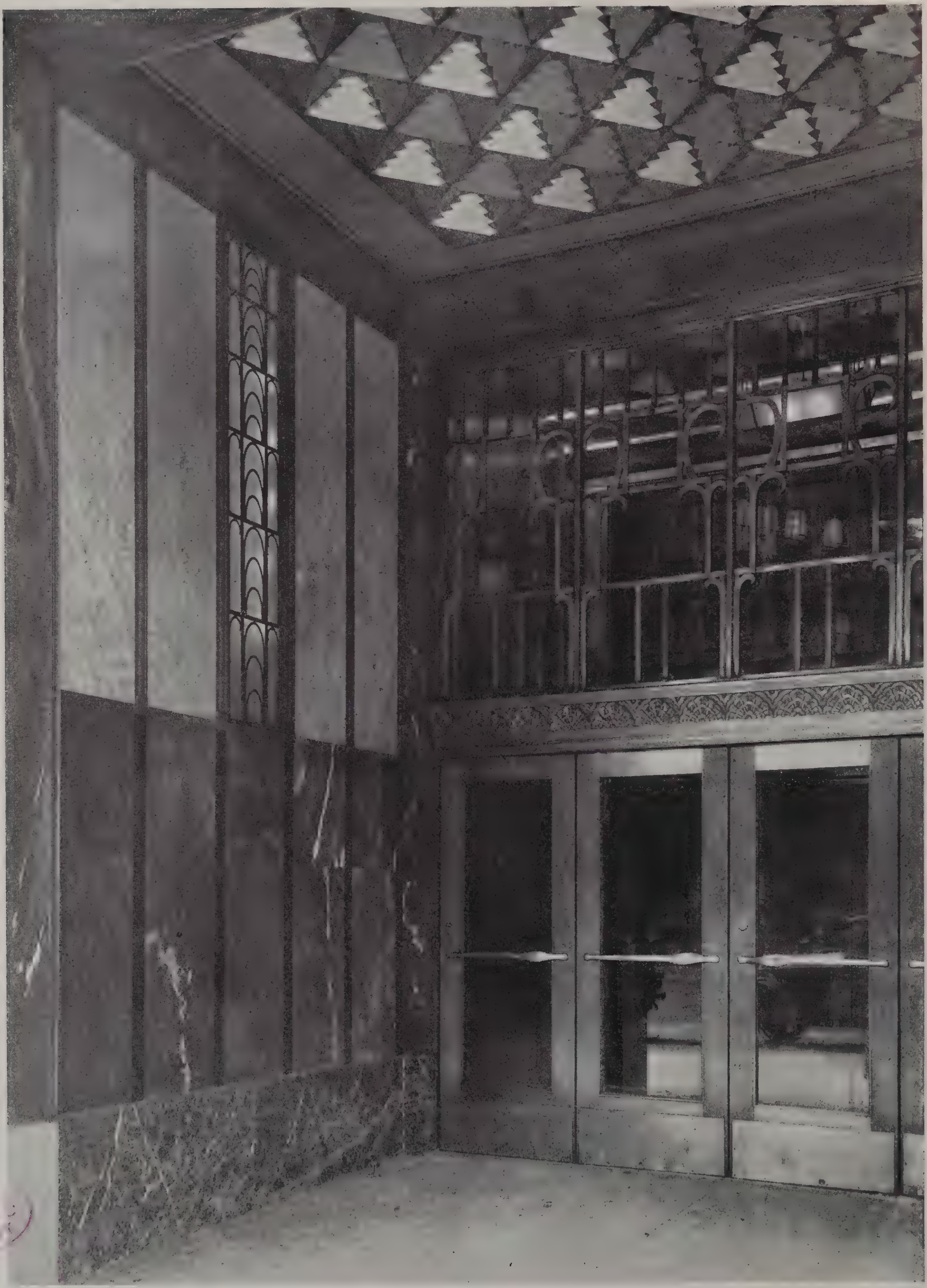
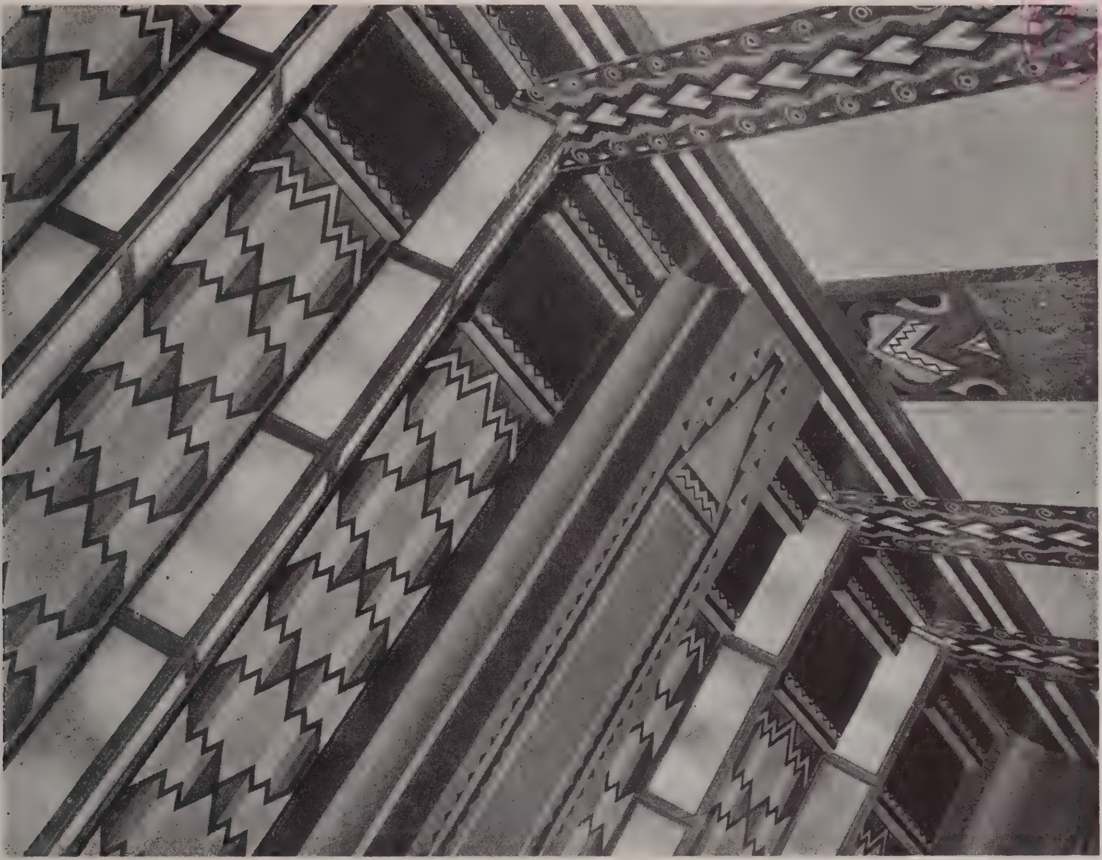
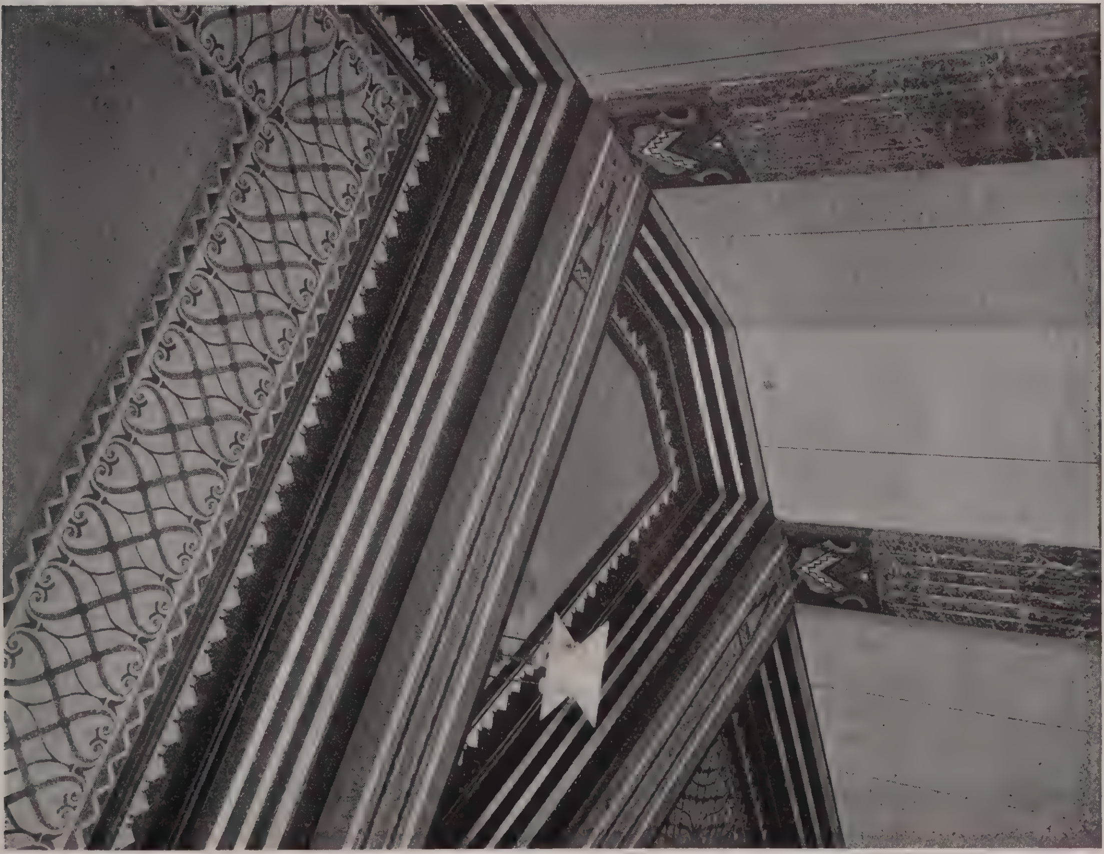


OUTER VESTIBULE

STATE TOWER BUILDING, SYRACUSE

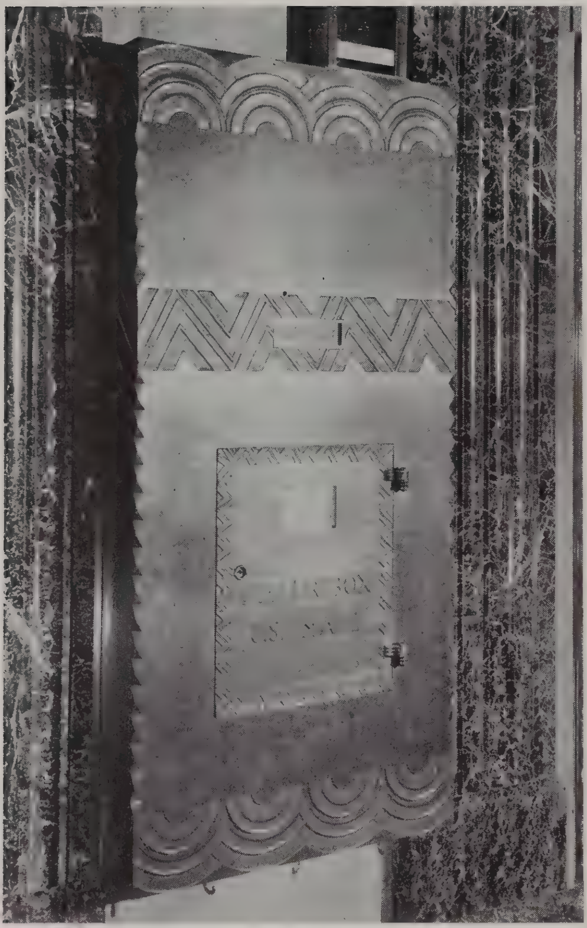


CEILING OF ELEVATOR LOBBY

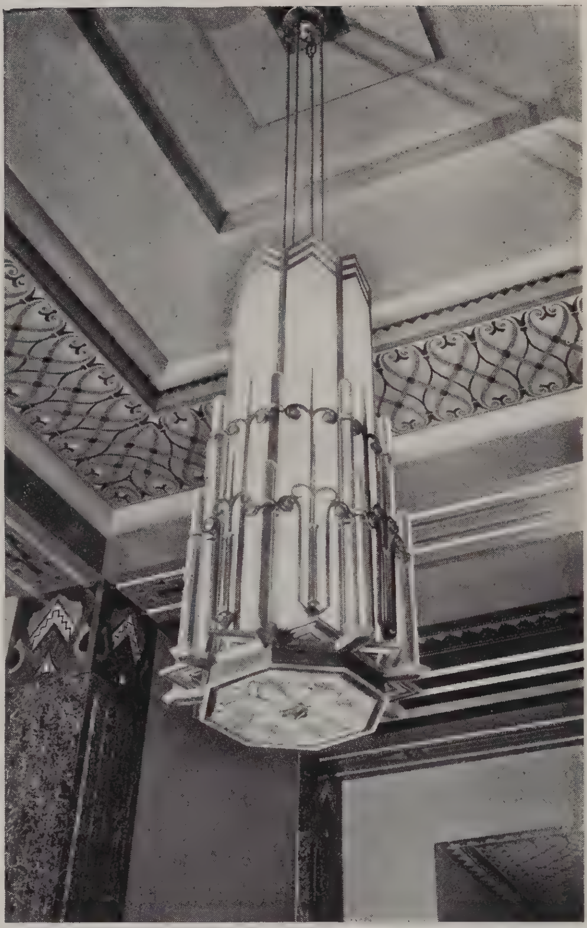


CEILING OF ENTRANCE HALL

STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL ARCHITECTS



Mail Box in Lobby



Lantern in Entrance Hall

The pilasters are Tinos, as are the base and floor borders. The Tinos base is run out through the vestibules into the entrances, so that exterior and interior lead one into the other without sudden change. Enameled bronze caps, and enameled bronze strips above the elevator doors lend touches of brilliant color to the otherwise rather severe treatment. The use of enameled bronze is eminently successful. Except in the elevator lobby, color in the arcade is confined to the ceilings, so as not to interfere with window displays.

Every question affecting renting, management and maintenance was gone over with experts, and the building is "metropolitan" in its completeness and equipment. All offices have lavatories, and gas, compressed air and power are provided for doctors and dentists. Sash are of the projected type with the lower large lights stationary for display lettering. Venetian blinds are used. Roofs, except that of the garage, are tiled. Corridors are 8 feet wide, with terrazzo floors and marble wainscots. Permanent light is assured all offices. The garage, of the ramp and staggered floor type, accommodating about 150 cars and connecting directly with the main building, has been a large factor in the quick renting of the building. It is so isolated by fire walls that insurance on the office building is no higher than if there were no garage.

Editor's Note. It is an interesting fact that in Syracuse, as in many of the other smaller cities of the country, splendid examples of modern architecture are being erected. It is by mere coincidence that both the new Telephone Building by Voorhees, Gmelin & Walker in Syracuse and the State Tower Building by Thompson & Churchill in the same city happen to be shown in this issue of THE ARCHITECTURAL FORUM. Although quite different in their individual expressions of modern commercial architecture, each building is a splendid example of the freedom from precedent shown in the best of our recent American work. The word "modern" should be used in connection with such buildings as these only as it indicates the recent completion of them. All examples of architectural design as created in each successive year are "modern" in the sense of time. In our opinion, the expression "Modernistic" as indicating a distinctive and unusual style of architecture or painting is mis-used. The many examples of exotic and neurotic architectural design found today in the principal countries of Europe might be termed "Frenzied Architecture."

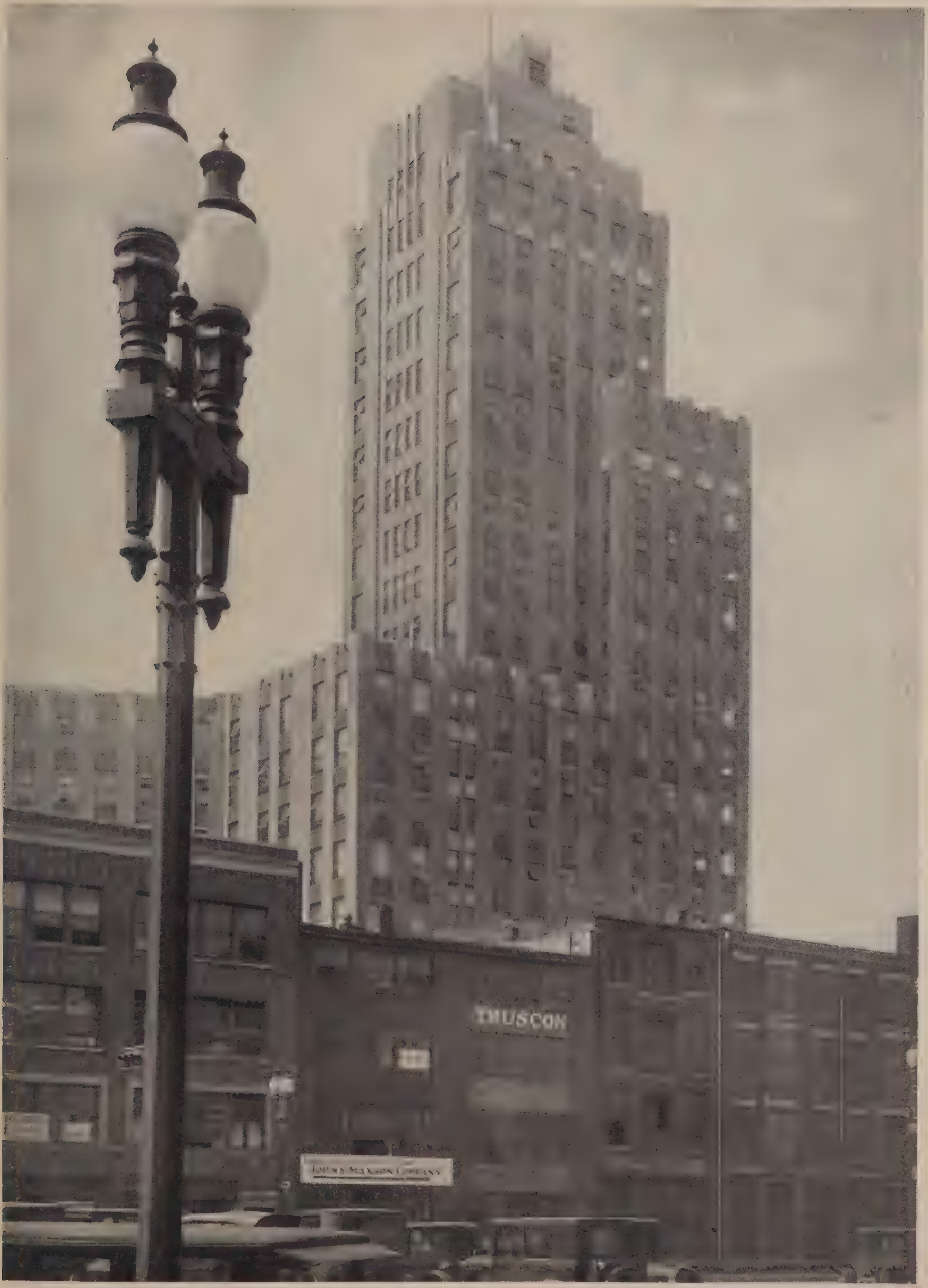
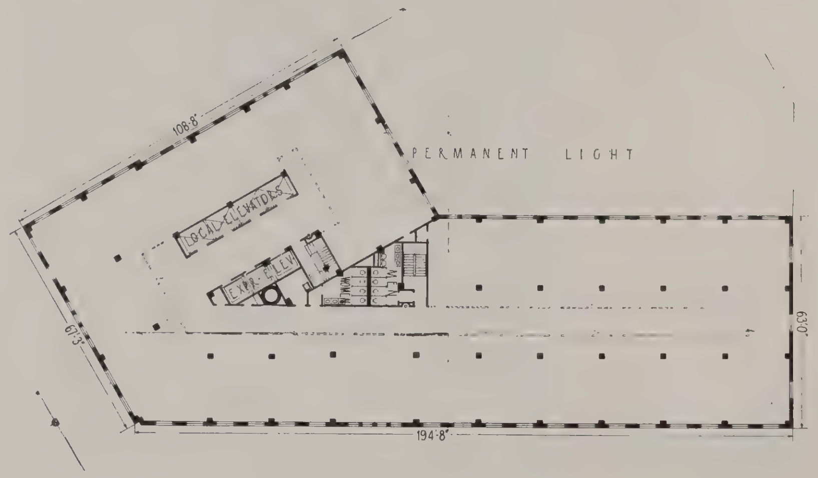


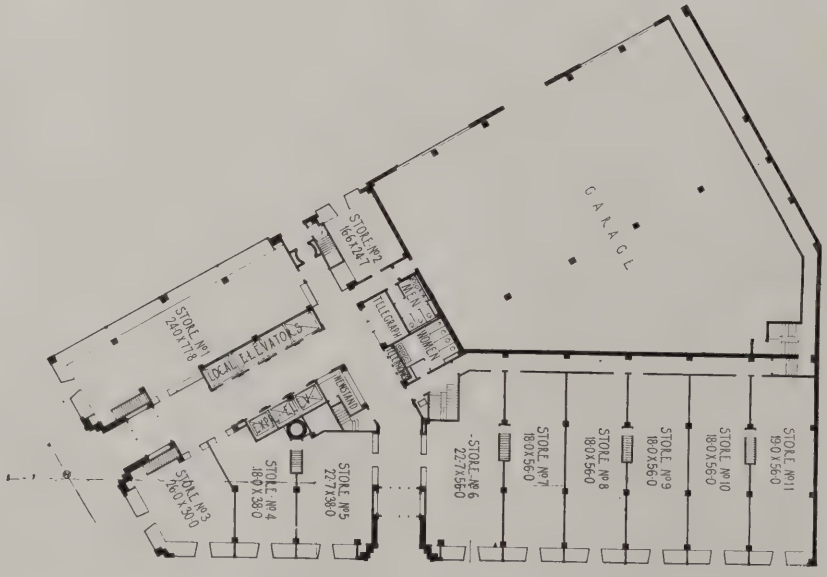
Photo. Sigurd Fischer

Plans on Back

STATE TOWER BUILDING, SYRACUSE
THOMPSON & CHURCHILL, ARCHITECTS



A TYPICAL FLOOR

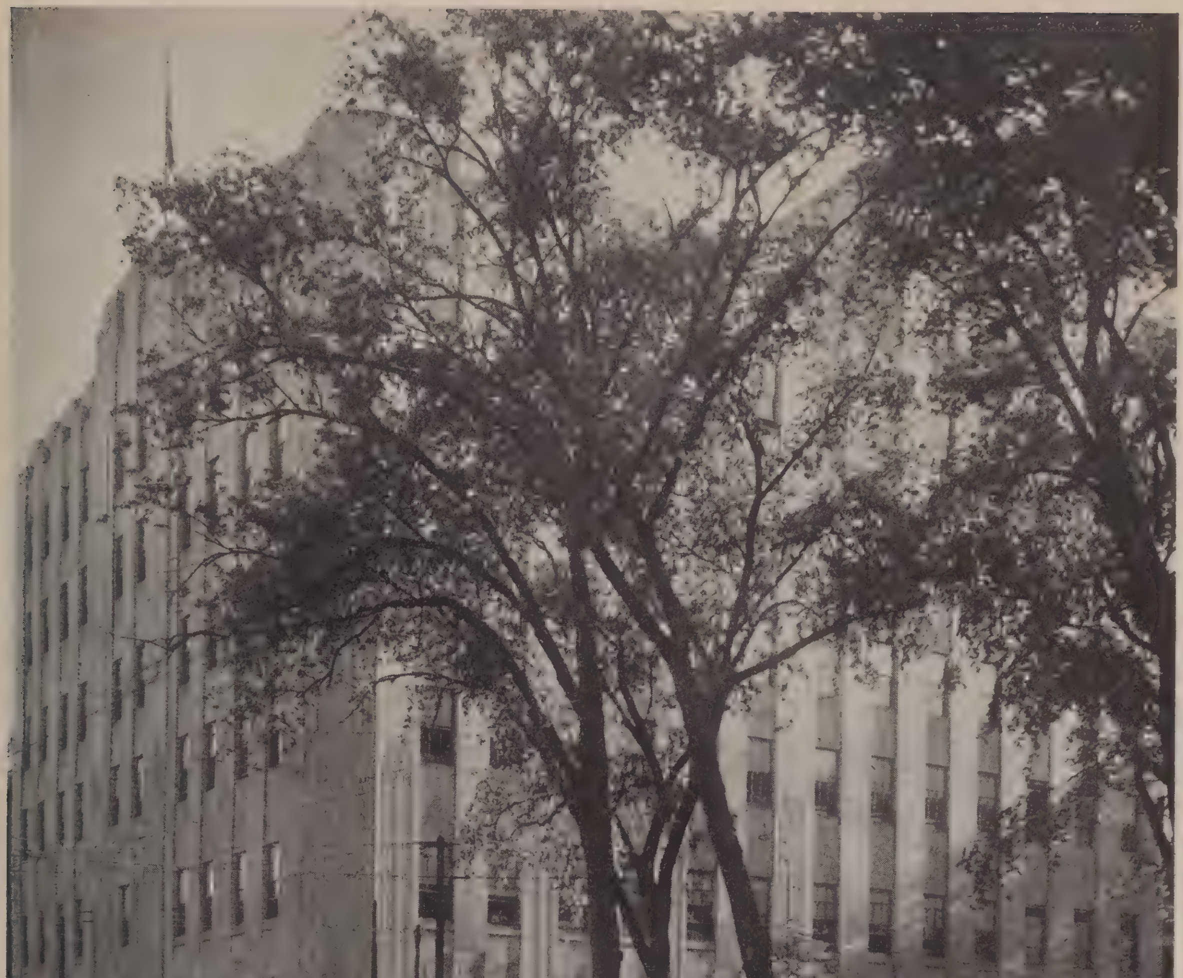


FIRST FLOOR

PLANS: STATE TOWER BUILDING, SYRACUSE

THOMPSON & CHURCHILL, ARCHITECTS

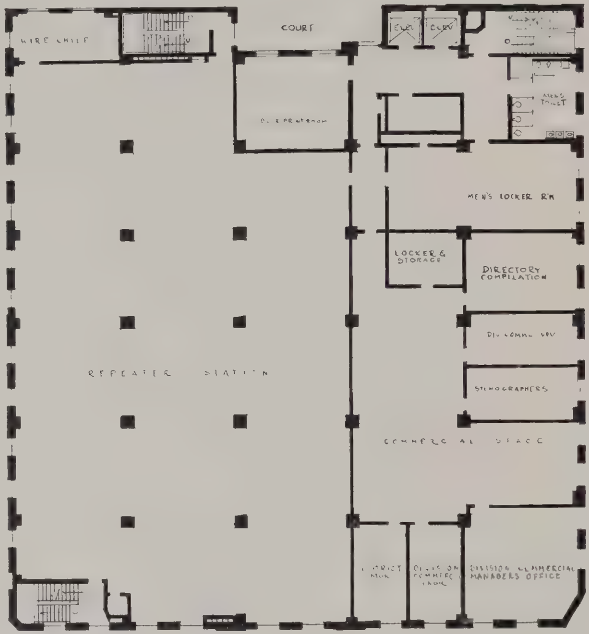
PUBLIC



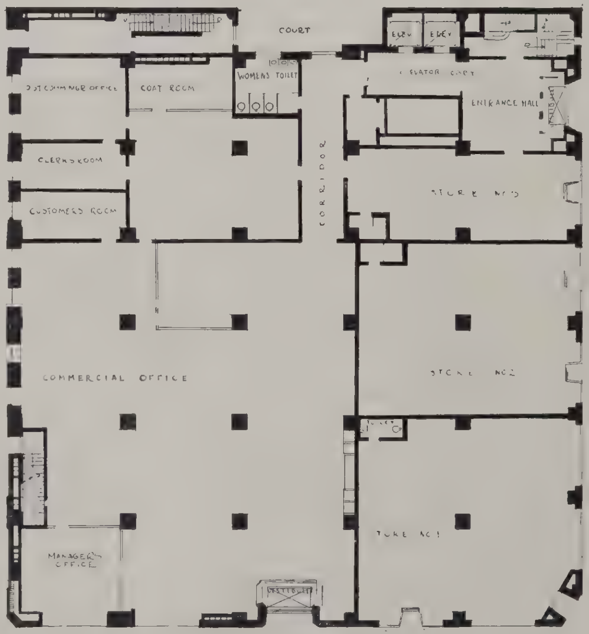
Photos. Ira Wright Martin

Plans on Back

TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



FIFTH FLOOR

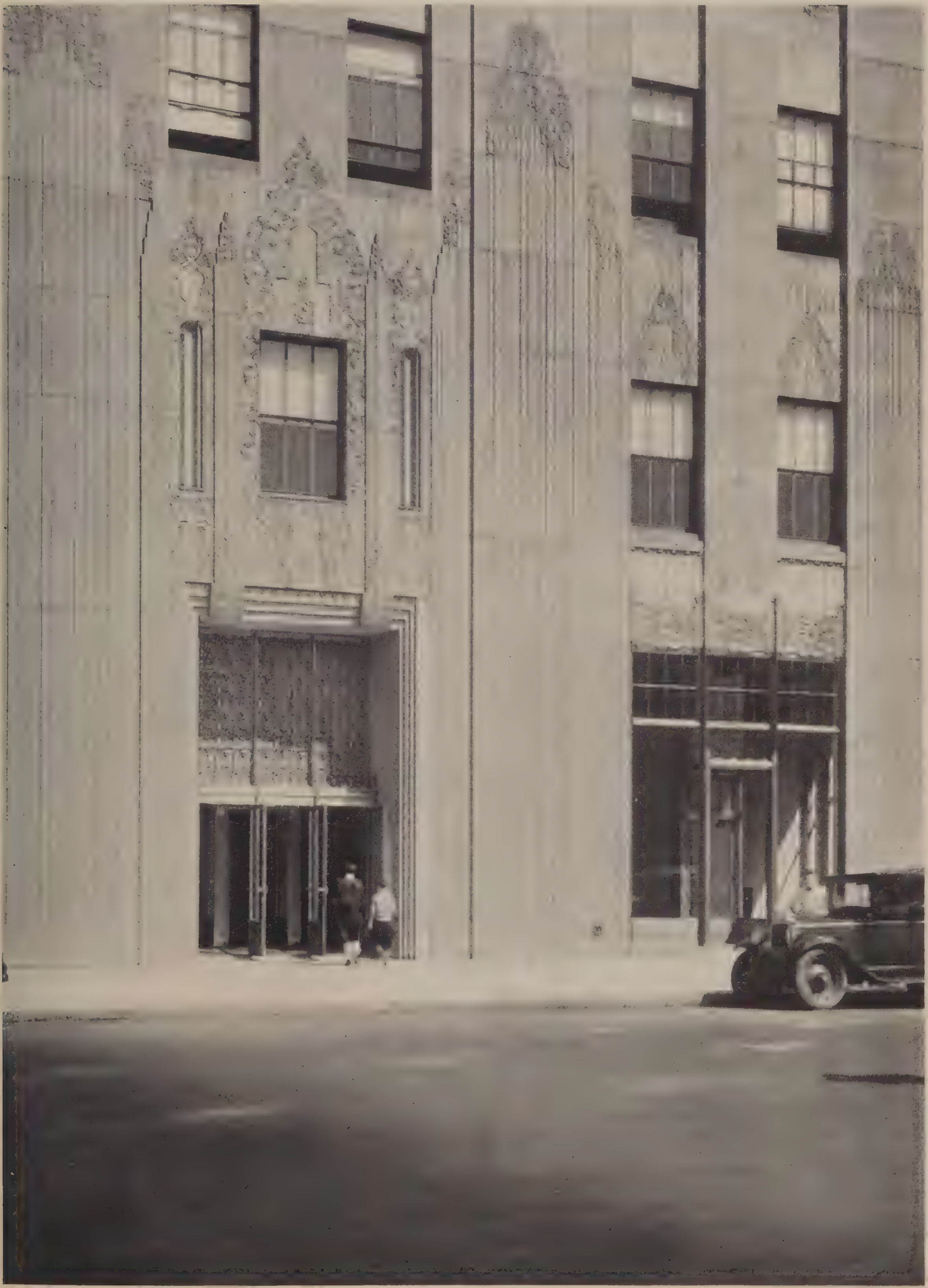


FIRST FLOOR

PLANS: TELEPHONE BUILDING, SYRACUSE

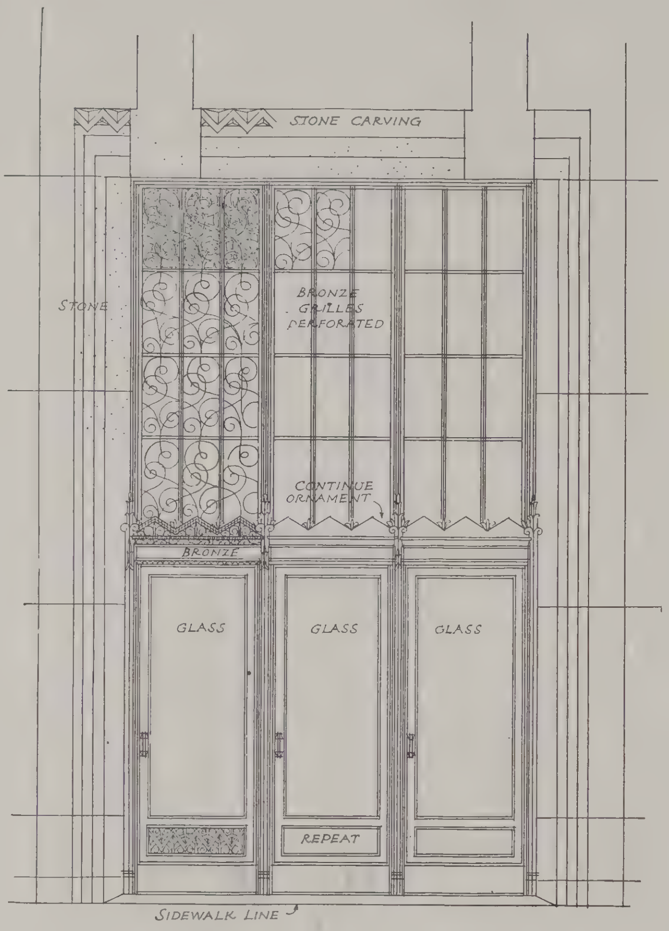
VOORHEES, GMELIN & WALKER, ARCHITECTS

PUBLIC LIBRARY



Detail on Back

TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



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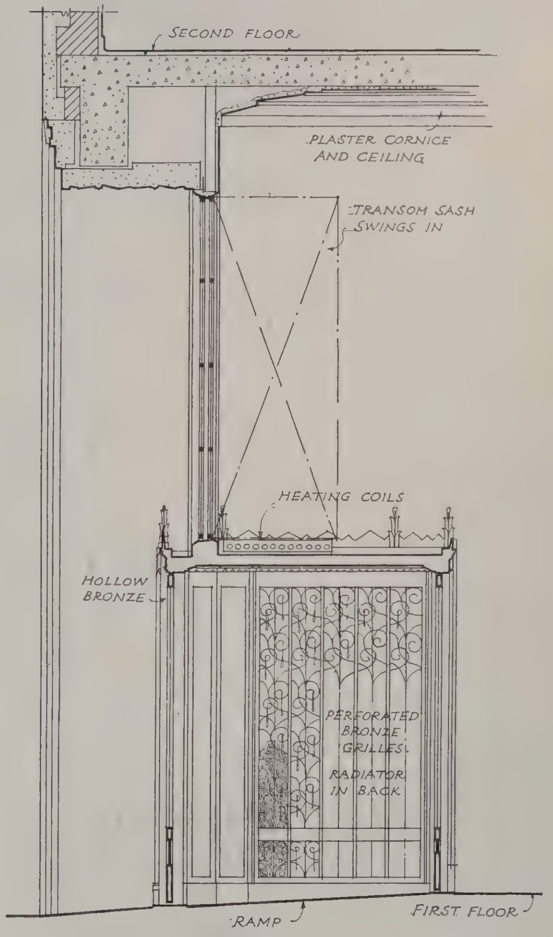

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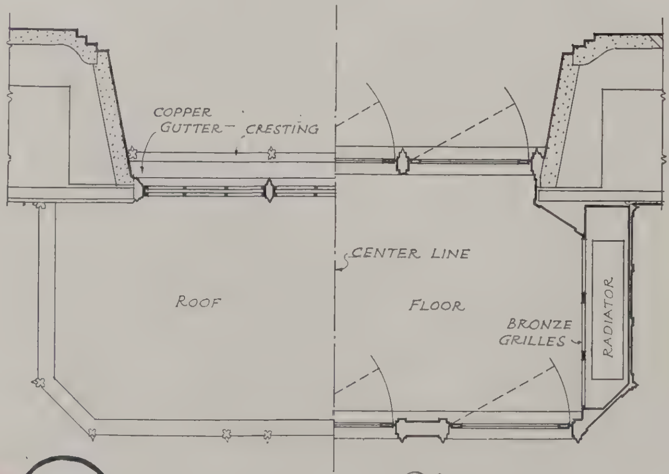

Plan

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SCALE IN FEET

ENTRANCE DETAIL

THE NEW YORK TELEPHONE COMPANY
SYRACUSE, NEW YORK

VOORHEES, GMELIN AND WALKER.
ARCHITECTS

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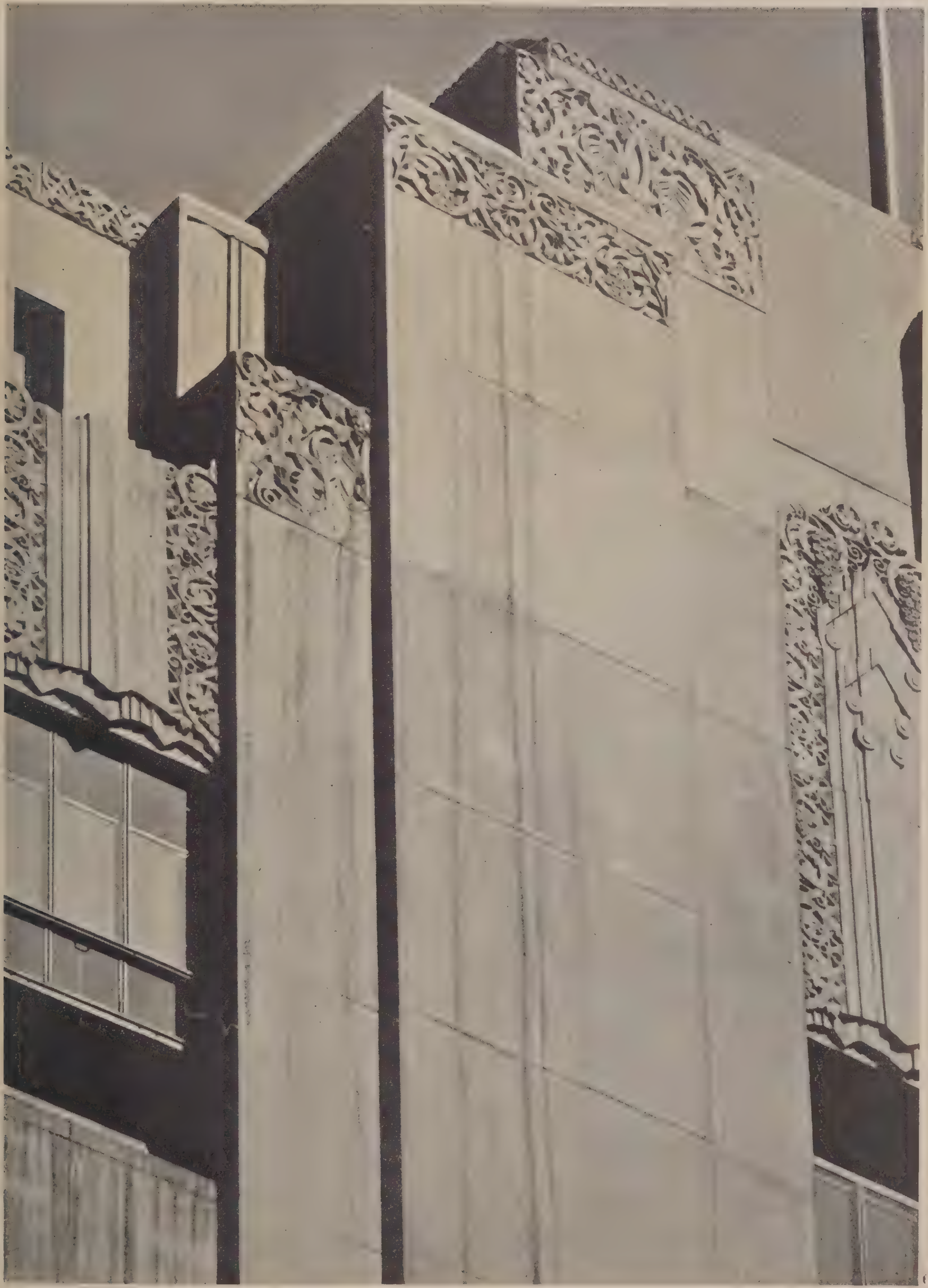
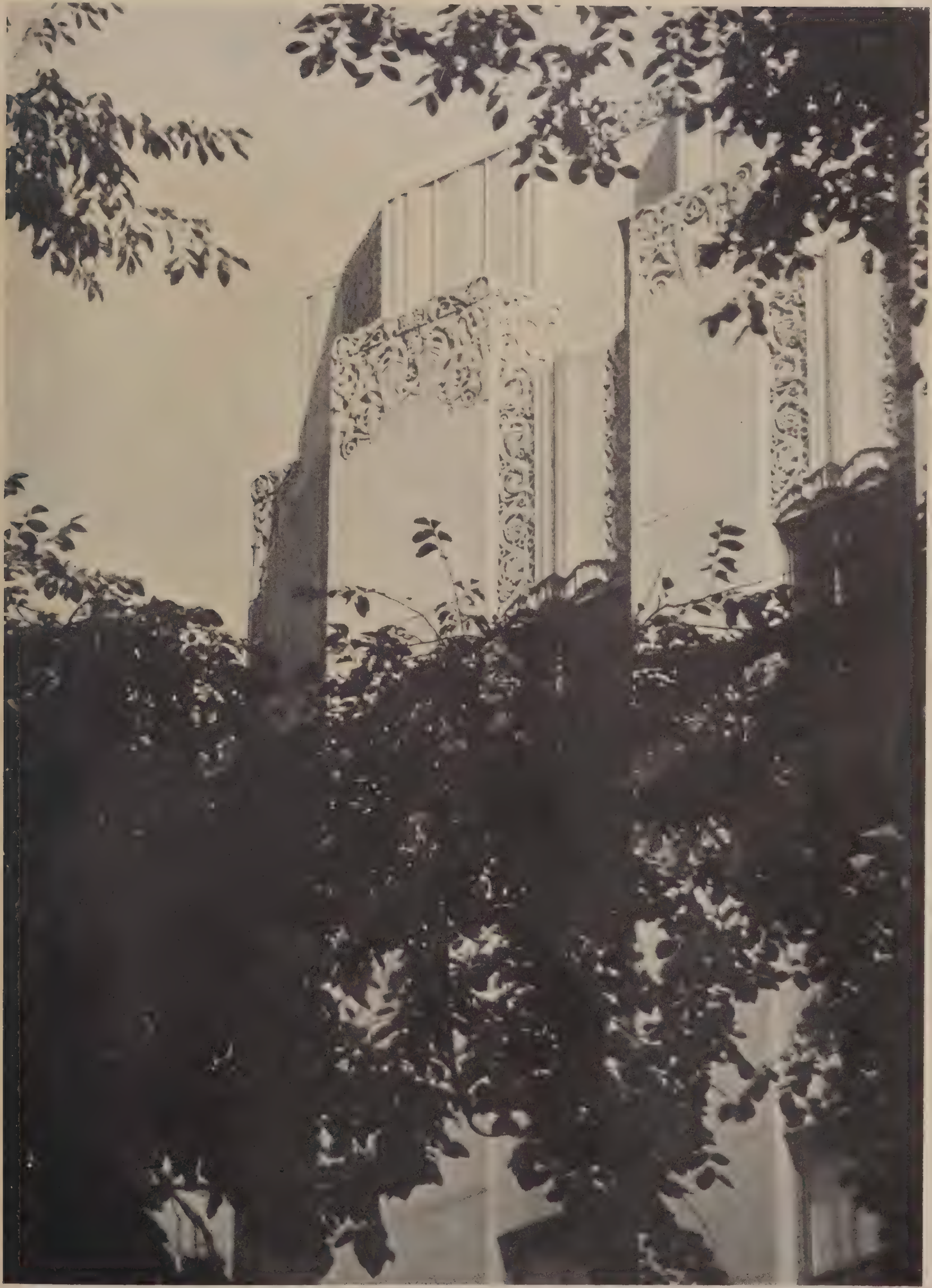
The ARCHITECTURAL FORUM DETAILS



TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS



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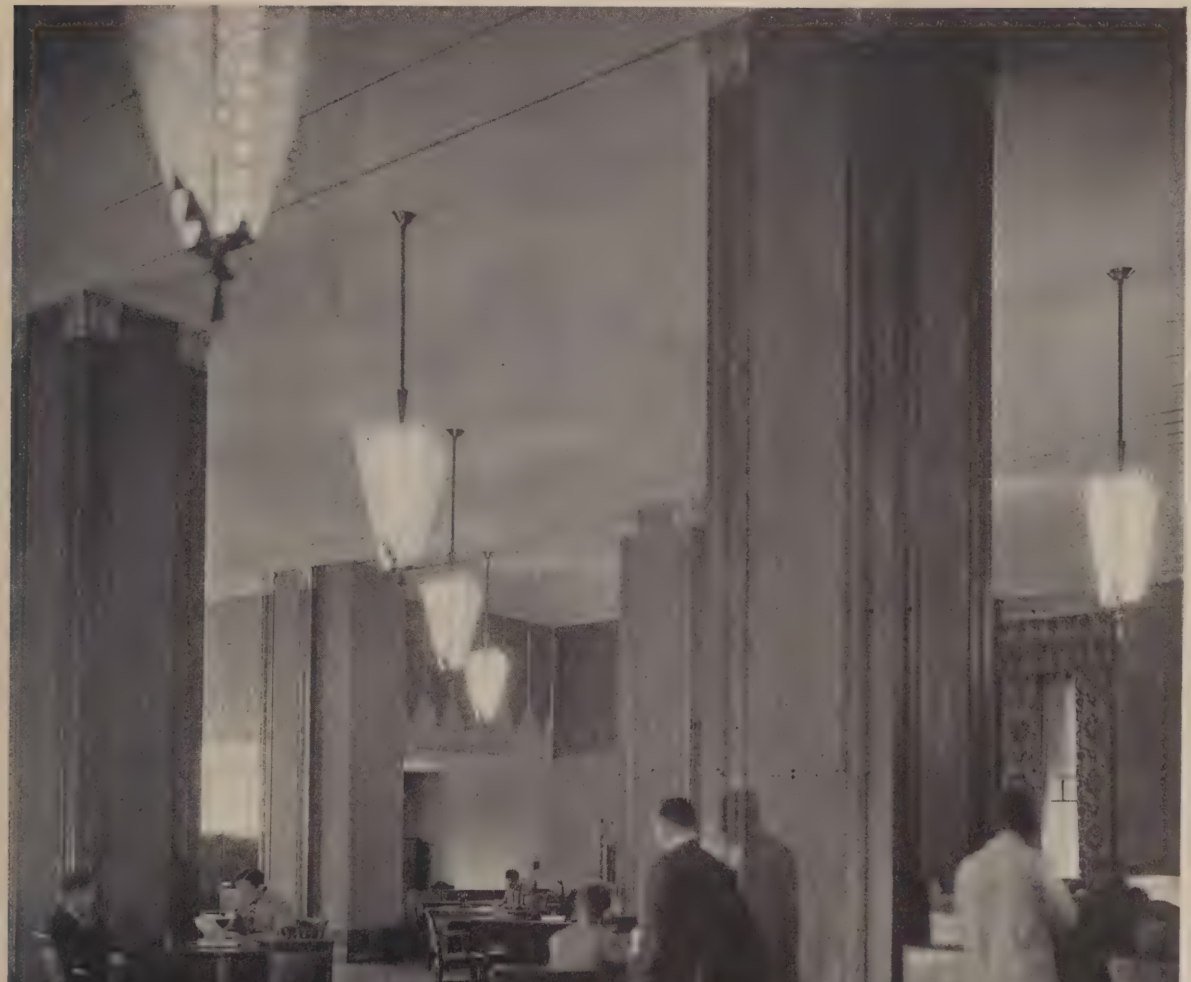
VOORHEES, GMELIN & WALKER, ARCHITECTS



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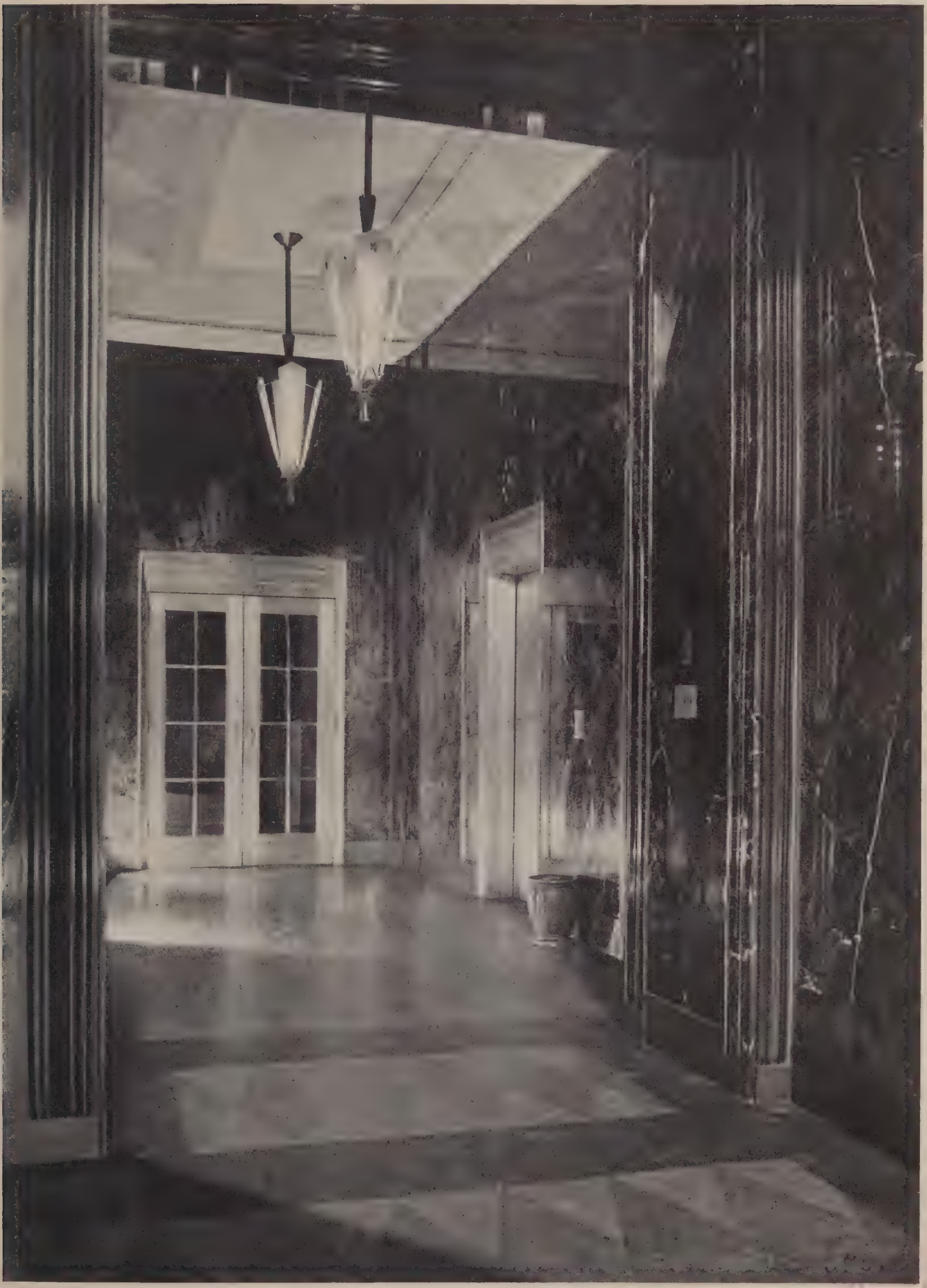
VOORHEES, GMELIN & WALKER, ARCHITECTS



TELEPHONE BUILDING, SYRACUSE
VOORHEES, GMELIN & WALKER, ARCHITECTS

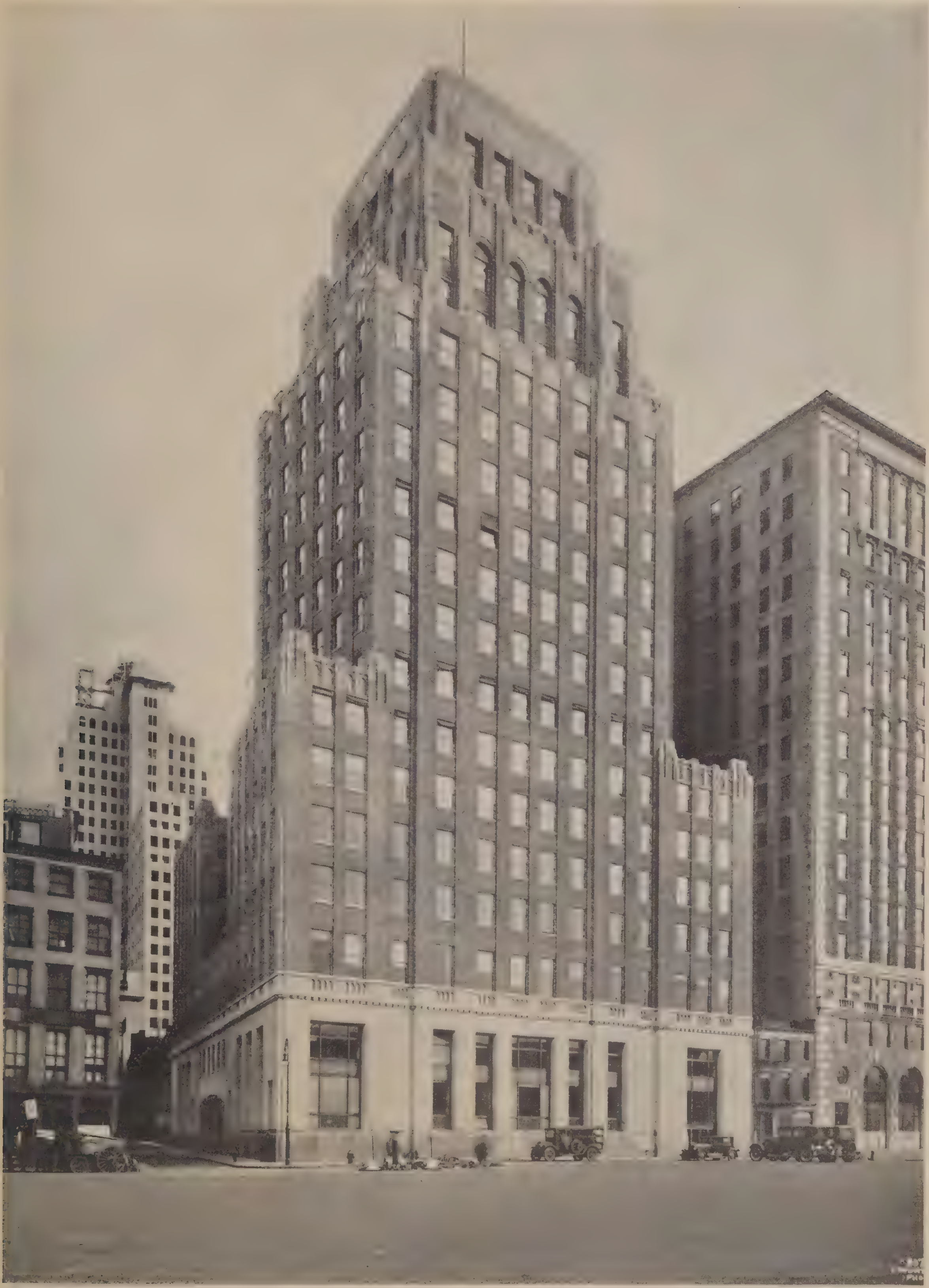


Photo. Wurts Bros. *Plans on Back*

EVENING POST BUILDING, NEW YORK
HORACE TRUMBAUER, ARCHITECT

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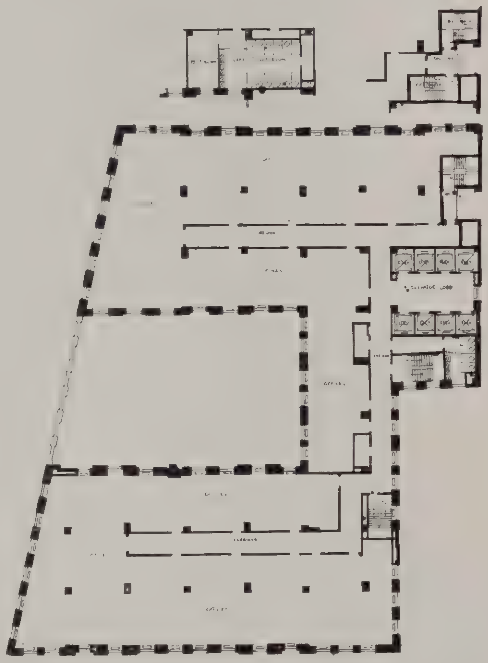
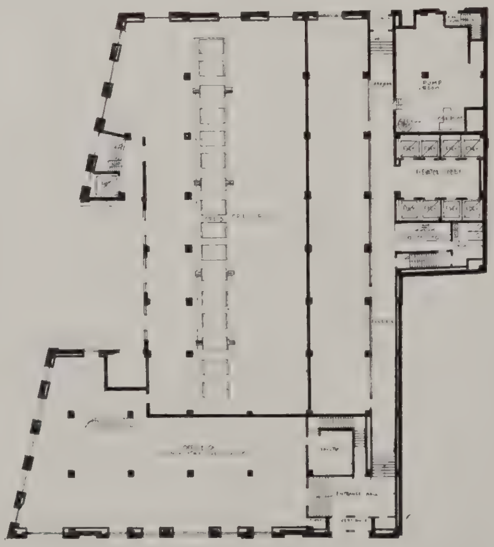


A TYPICAL FLOOR



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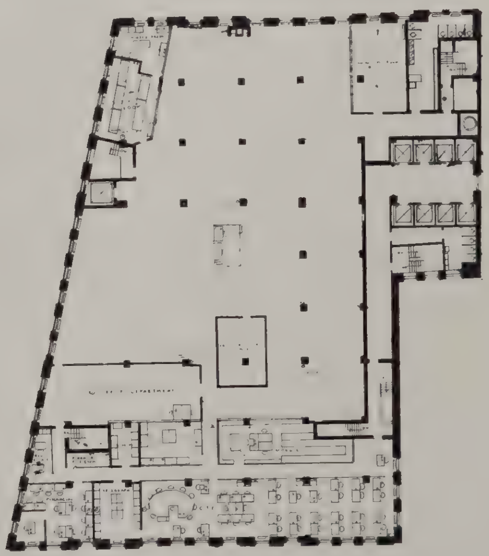
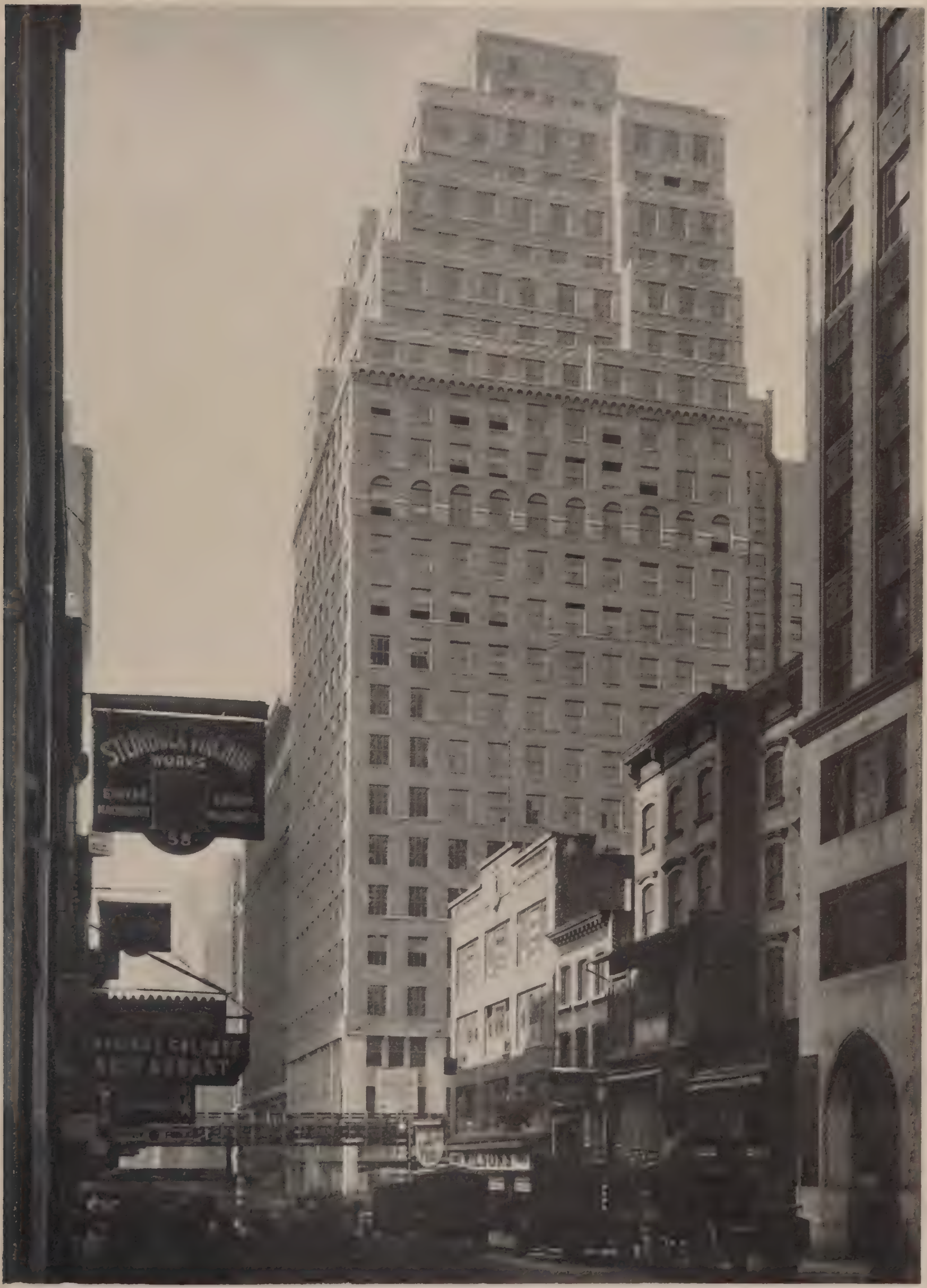


SECOND FLOOR

PLANS: EVENING POST BUILDING, NEW YORK
HORACE TRUMBAUER, ARCHITECT

BOSTON PUBLIC LIBRARY



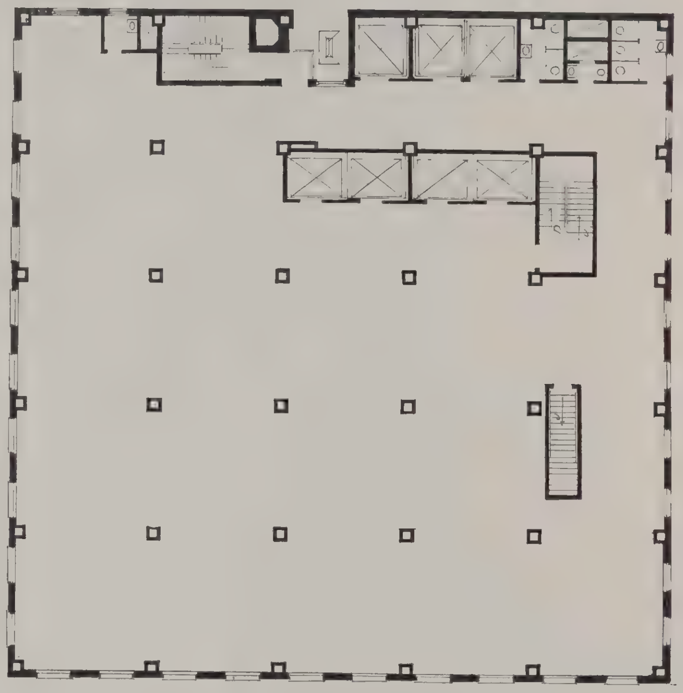
Photos. Sigurd Fischer

Plans on Back

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

PUBLIC



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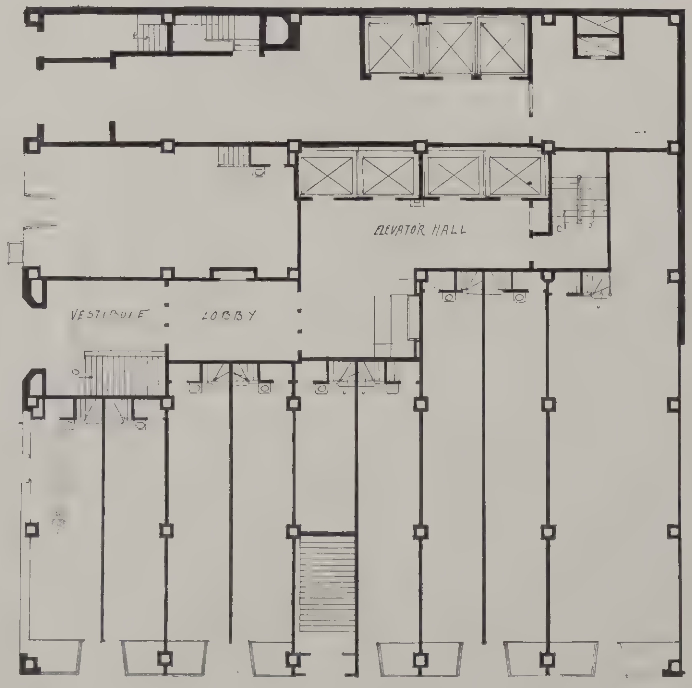
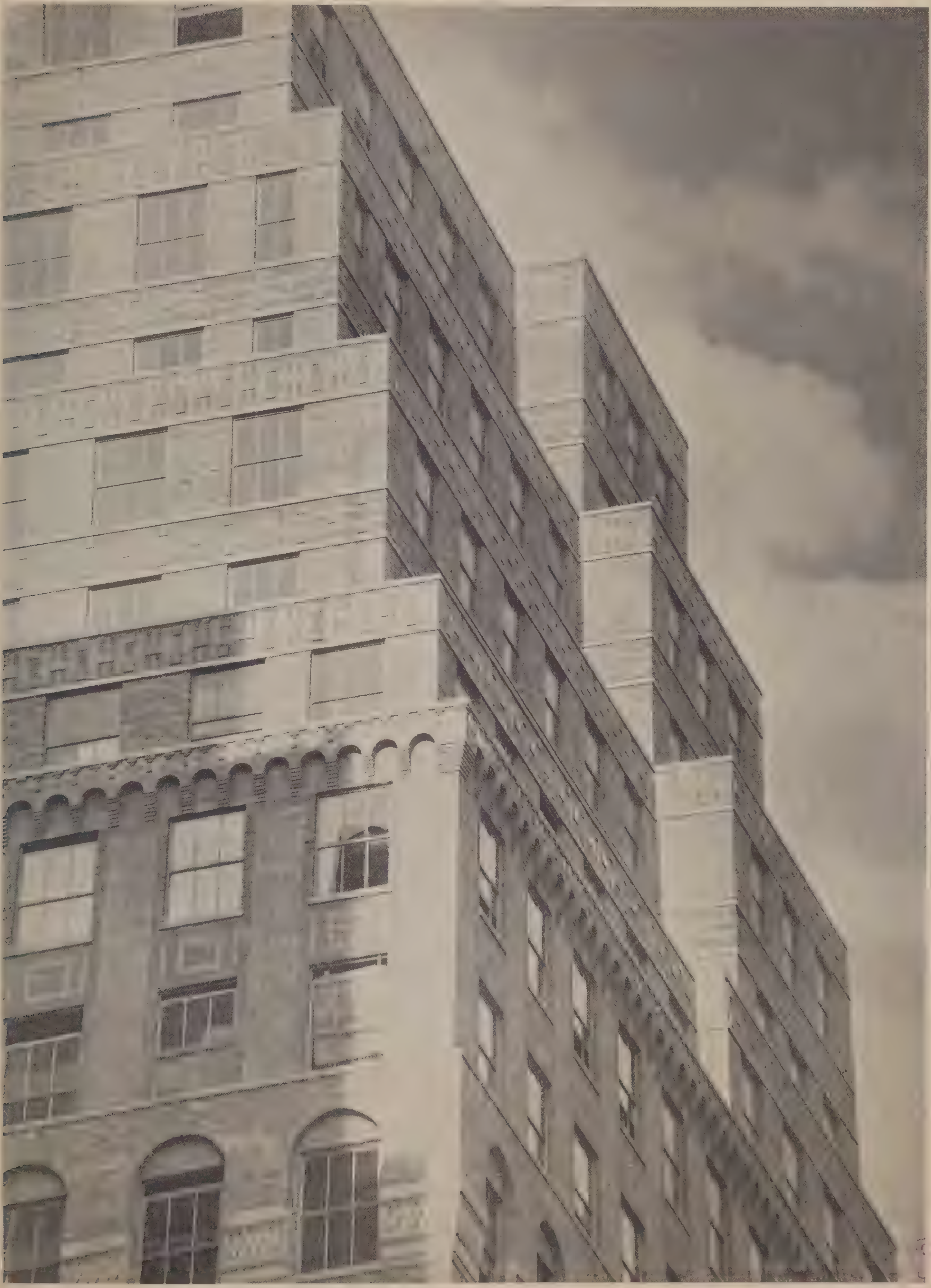


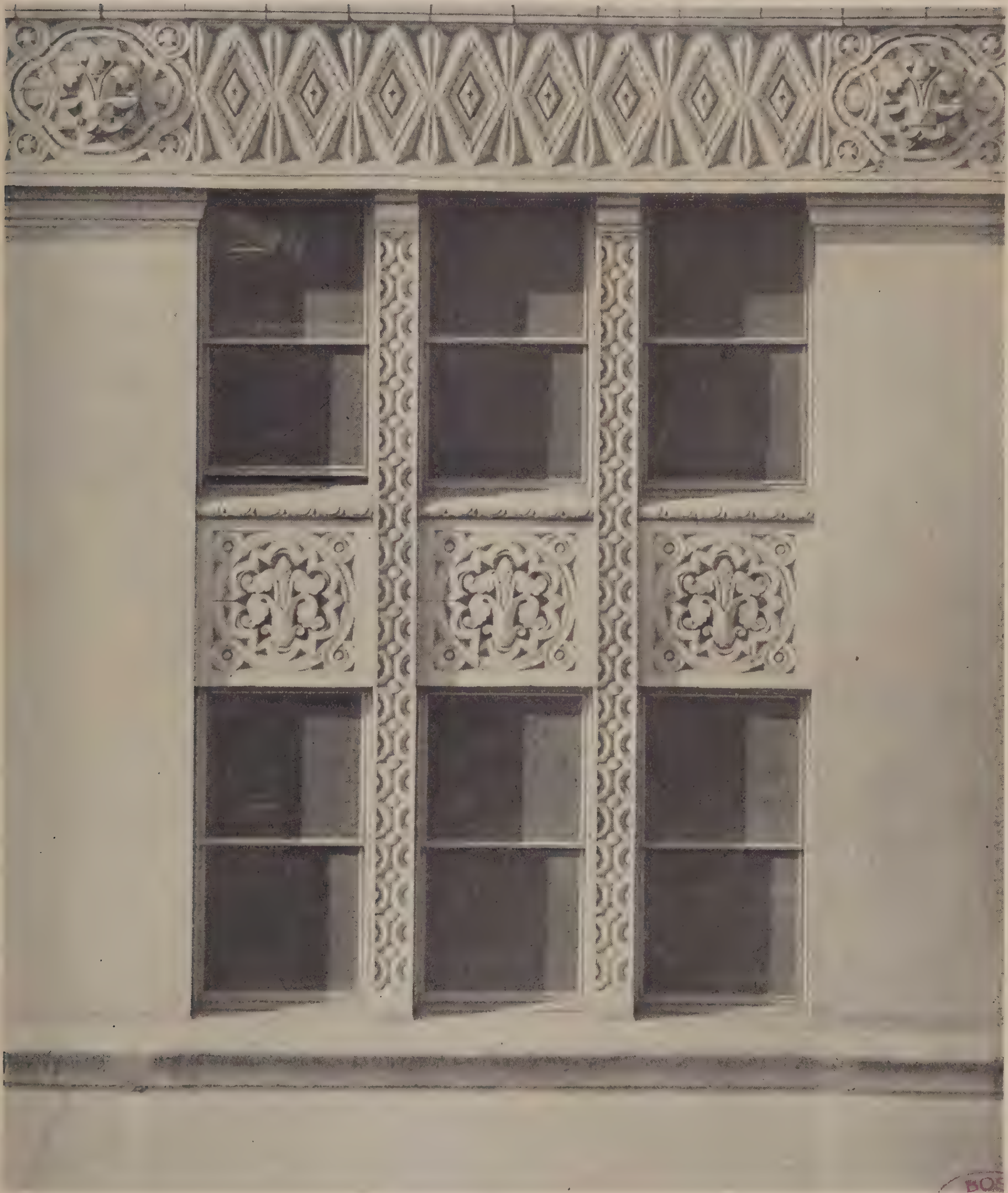
FIRST FLOOR

BOSTON

PLANS: BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK



BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

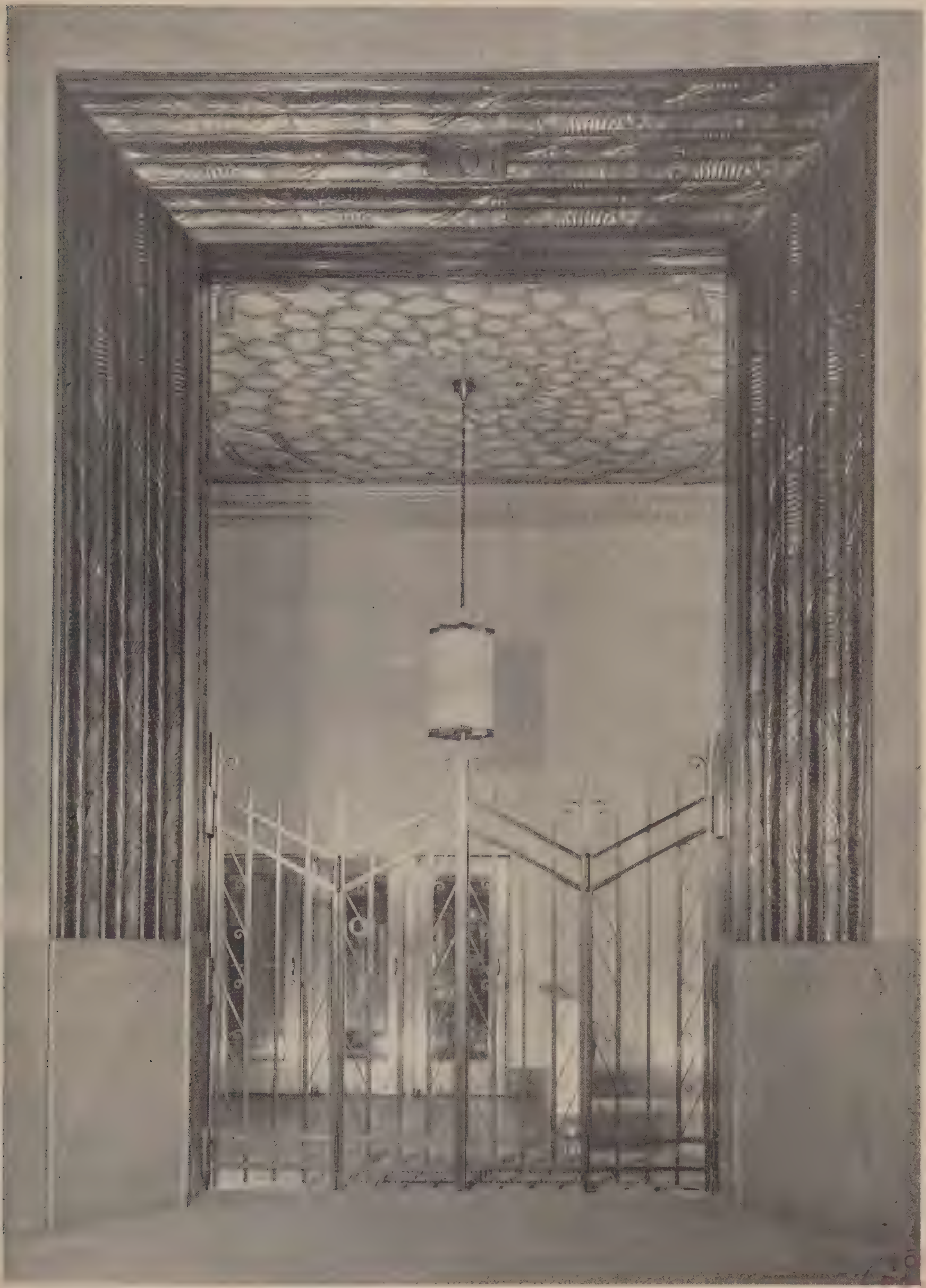


A DETAIL

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

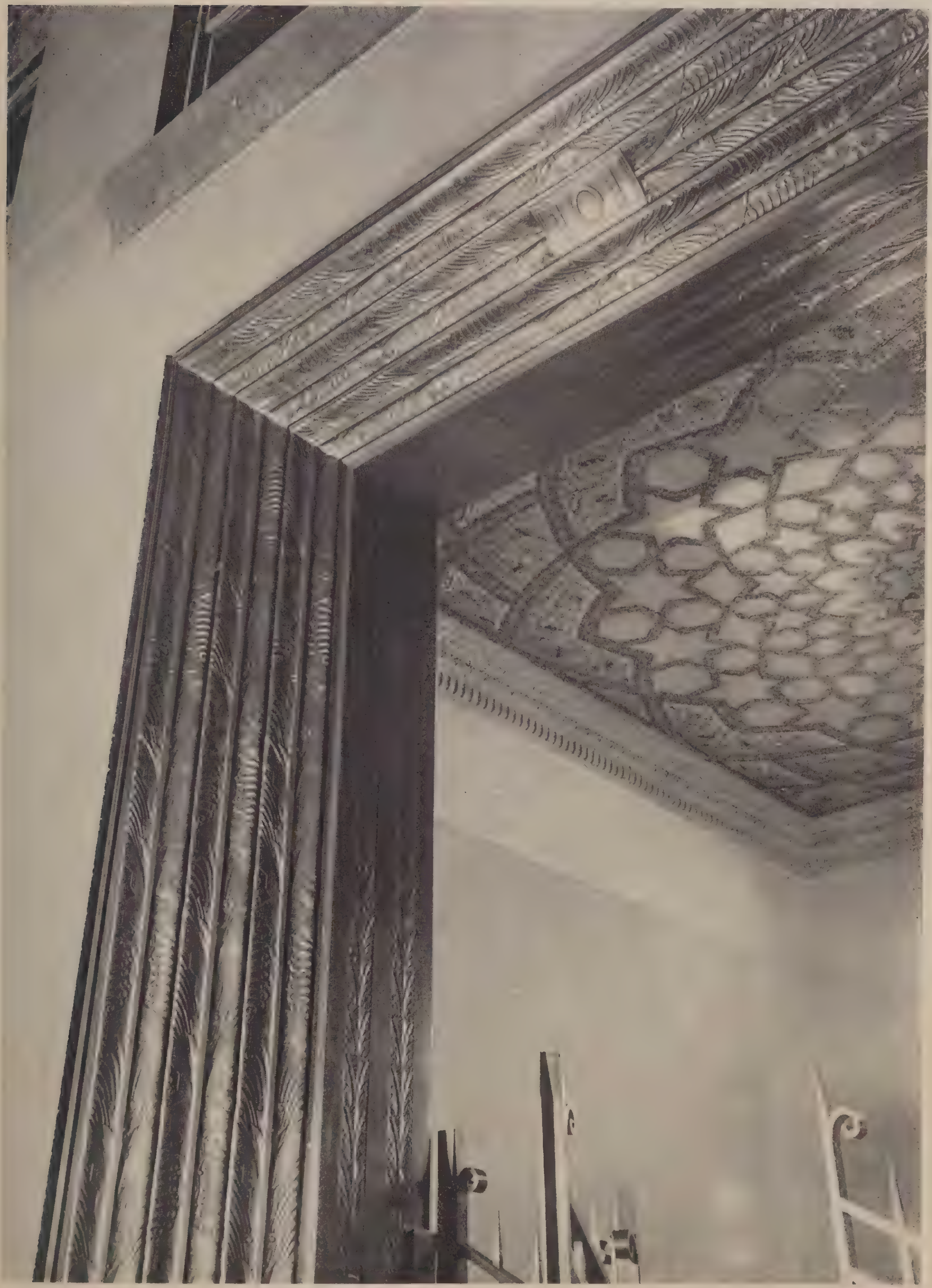
BOS PUBLIC



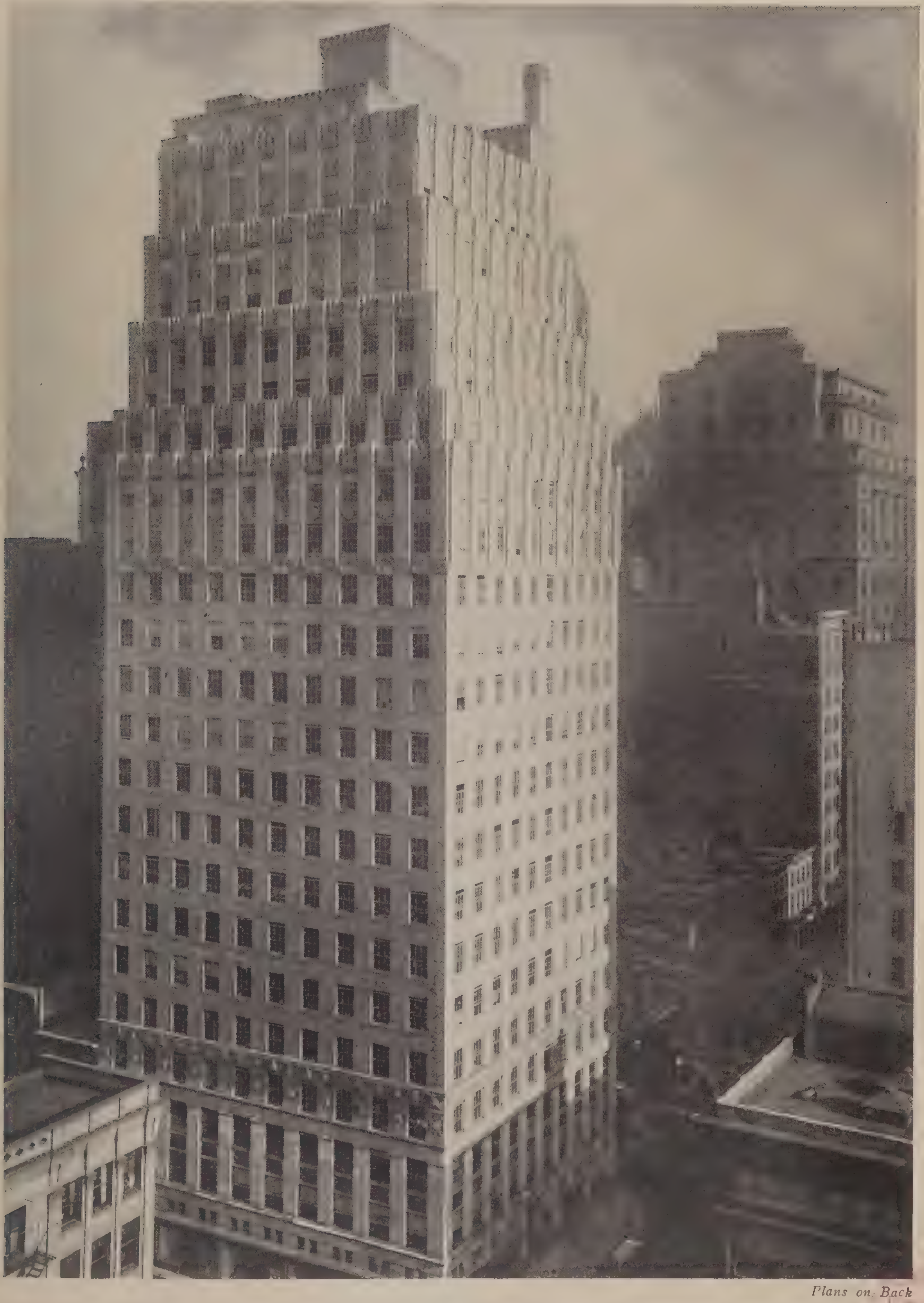
MAIN ENTRANCE

BUILDING AT CORNER OF SIXTH AVENUE AND 37TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

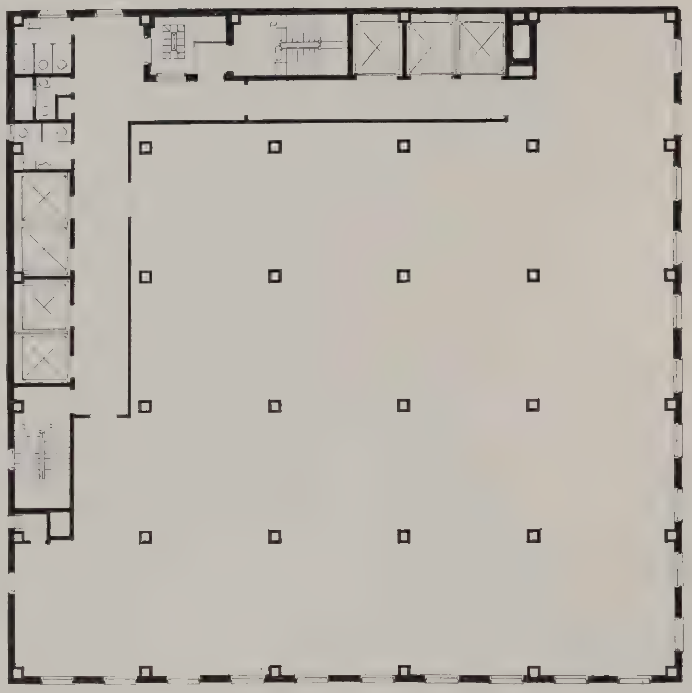


DETAIL, ARCHITECTURE OF ENTRANCE DOOR
BUILDING AT CORNER OF SIXTH AVENUE AND 37th STREET, NEW YORK
BUCHMAN & KAHN, ARCHITECTS

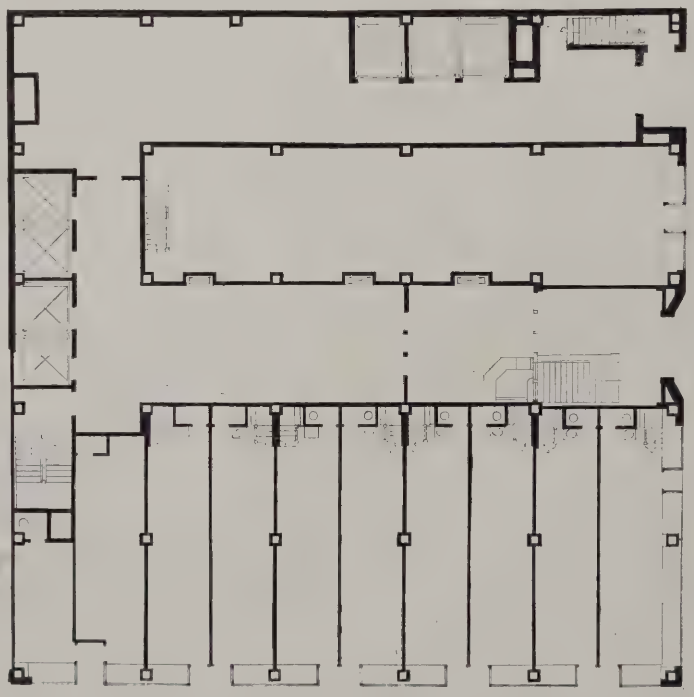


Plans on Back

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK
BUCHMAN & KAHN, ARCHITECTS



SECOND TO SIXTEENTH FLOOR



FIRST FLOOR

PLANS: MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

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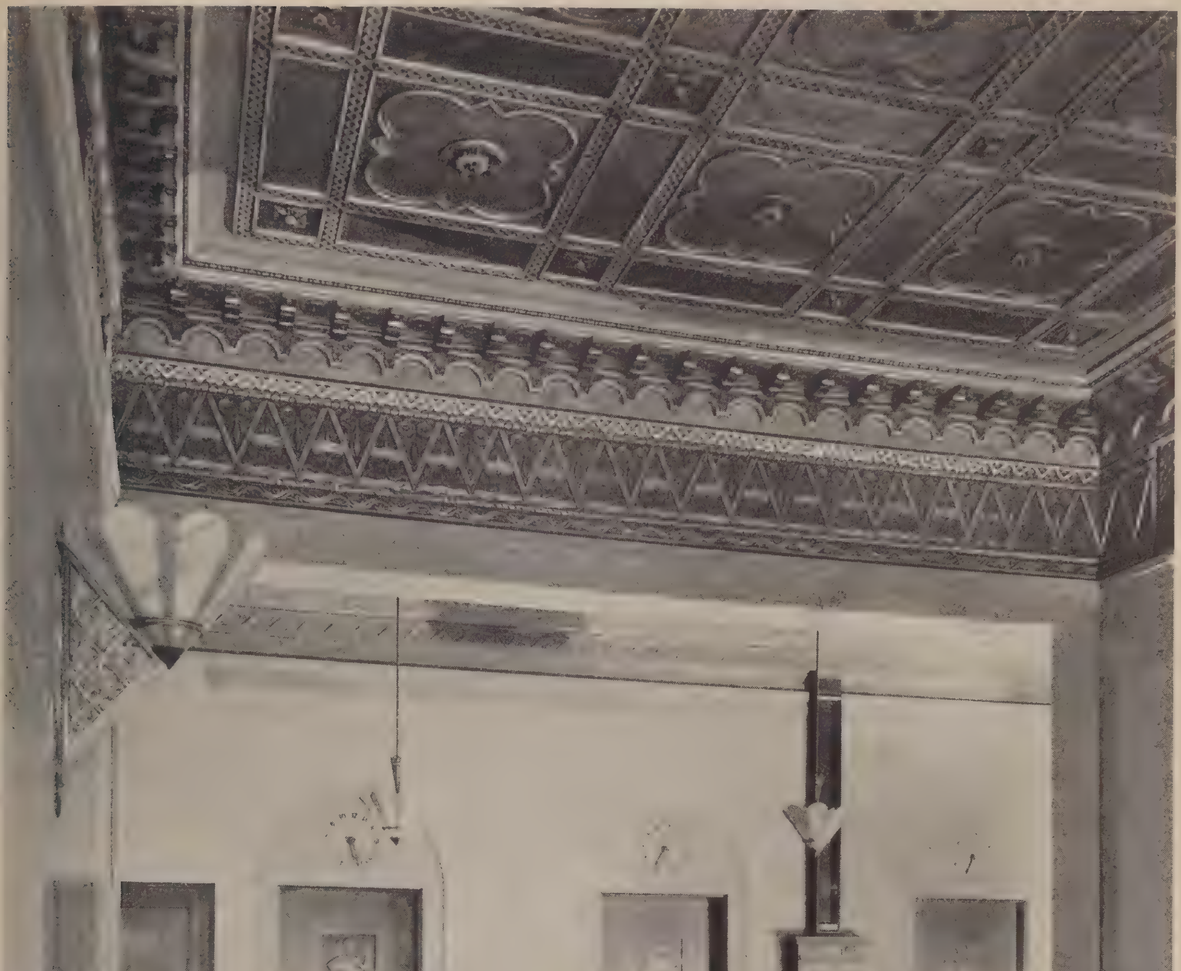
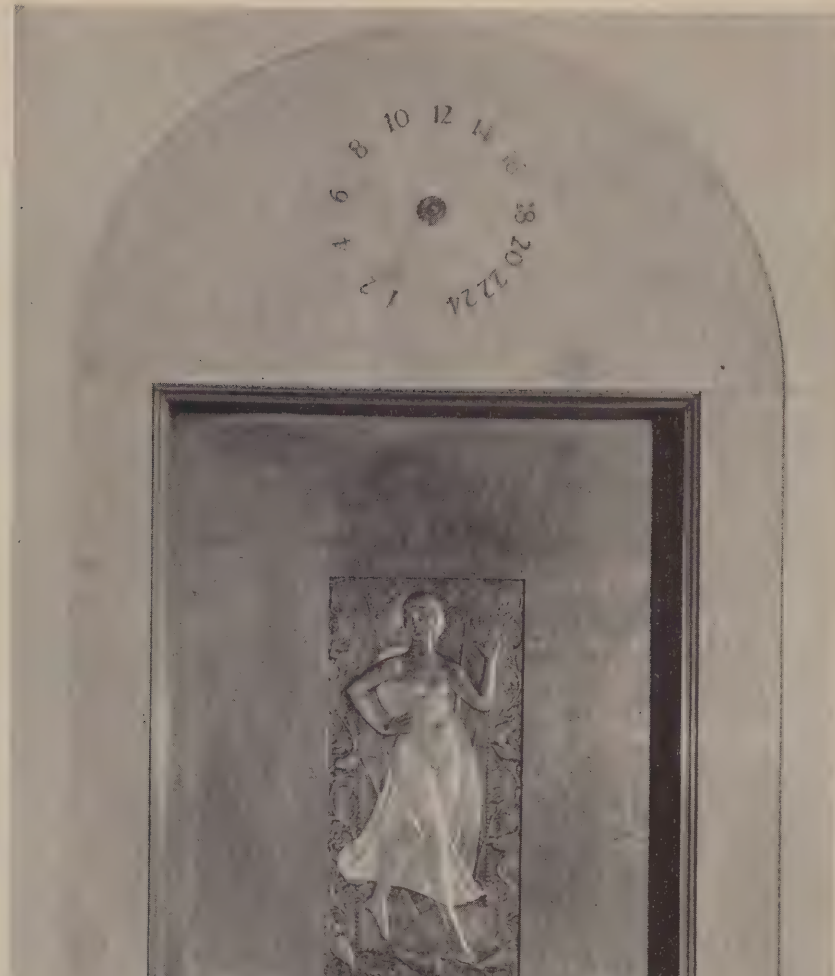


ELEVATOR LOBBY

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



DETAIL, ELEVATOR DOOR

MILLINERY BUILDING, SIXTH AVENUE AND 39TH STREET, NEW YORK

BUCHMAN & KAHN, ARCHITECTS

BOSTON PUBLIC LIBRARY

RECENT EUROPEAN ARCHITECTURE

TEXT BY

RAYNE ADAMS

SKETCHES BY FRANCIS KEALLY

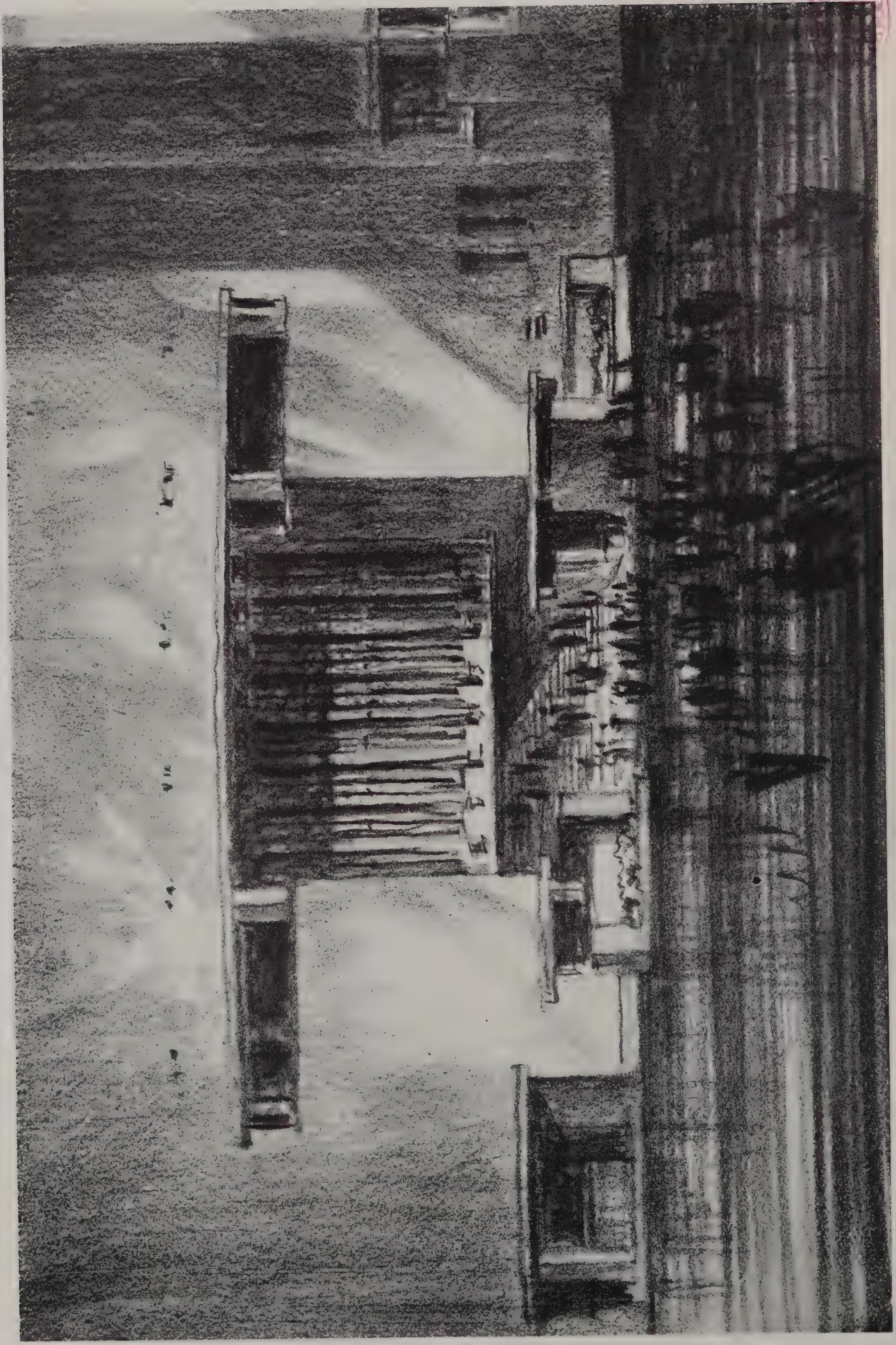
HOW many towns and villages have, among their various busy thoroughfares, one street which is marked by its decaying aspect,—its battered trees, sunken pavements and decrepit, unpainted houses! Yet, on the weathered signboard, the wayfarer may still read the mystic words "New Street." New it once was,—even as "Front Street," now a back street, circled the harbor line of the growing town. Every age,—every generation,—has its "New Street," along which its ardent youth runs. Every generation has its fling at "modernity." And, as the days lengthen into years, the "modern" quality in its work and thought becomes formulated,—and so it passes on, at times insensibly, without pains or penalties, into the great stockroom of the world's ideas.

"Modern." Perhaps the use of this word is inevitable in our attempt to characterize these successive outbursts of the creative instinct. A fatality in our common speech inheres in the difficulty of calling things by their definitive names. After all the child is usually born before he is named,—and good fortune does not always smile on him when the name is chosen! Among architects there should be no confusion, and yet there does exist such confusion as to what our so-called "modern" architecture exactly is; as to what it connotes and what are its formulæ; and the unhappy word "modern" is responsible for most of the confusion. One may justifiably believe that there should be a hospital,—even though it be only an illusory mansion of dreams,—for the repose of abused words. If we grant that the word "religion" should have the softest bed in this asylum, close beside it, in a bed almost as alluring, should be placed the word "art." And somewhere among those words broken and battered by the unrectified human conscience, we should find "modern."

The phase of art in which we are most interested here is architecture, and that particular phase of architecture which is known as "modern." Historically, we may limit the movement which has given us this architecture to the past 30 years, though it would be quite possible to trace its genesis to a much earlier period. Many and various are the sources of its being. One may mention as a cardinal influence the development of the use of steel construction,—accompanied by its thousand hand-maidens whose names, while perhaps not so appealing as those names which Rosetti held to be "five sweet symphonies," are nevertheless to be found gracing the ample volumes which go to making up "Sweet's Index" and those similar organs of enlightenment which every civilized country may boast. In other words, this is undoubtedly an age of engineering and sanitation, and it is from the fertile soil of great industrial achievement that the artist of today, as also the architect, may endeavor to draw his inspiration.

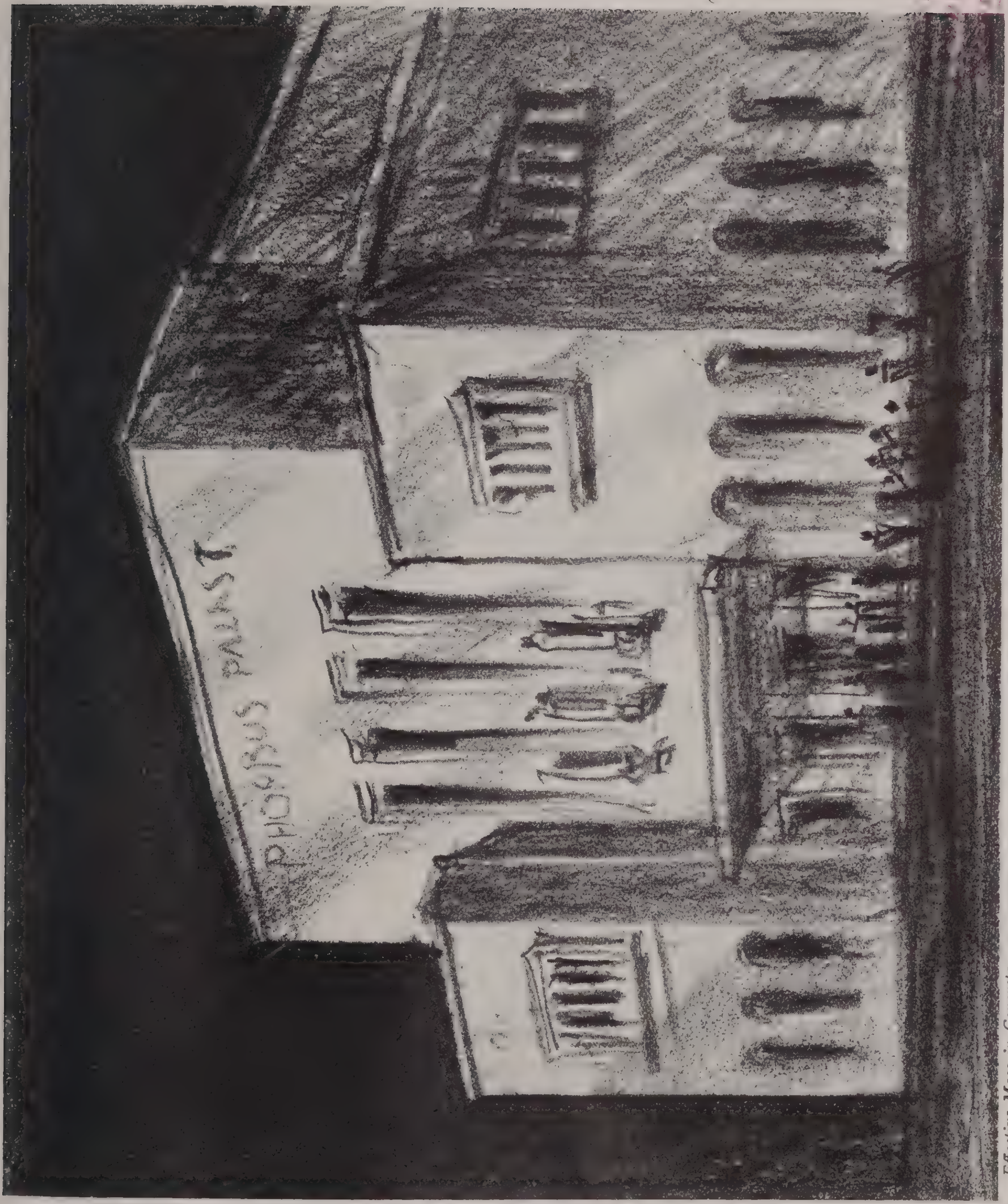
The illustrations accompanying this article are from sketches made by Mr. Keally during a recent trip to Europe, and the architecture, of which these sketches show representative examples, may bring to us interesting contrasts, if we view architecture sociologically. In the year 1800 there was, probably, little difference in the sanitary and housing conditions of Europe and those of America. Undoubtedly, in the larger centers, such as London and Paris, the standard of sanitation, of construction and of mechanical equipment was higher than in the United States, but in the 70 or 80 years which followed, this country made great progress in these matters. One of the factors making for this advance was the fact that for the most part Americans lived in impermanent wooden houses. The wealth of permanent, masonry buildings, common for centuries to all the civilized countries of Europe, was in itself a factor of conservatism, actually inhibiting the European from accepting or applying the improvements in sanitation and construction which the newly developing engineering and sanitary applied sciences were making possible. The population of America, moreover, was growing; new ground was being constantly broken; new habitations and towns were being continually thrust out into the wilderness,—or what had until lately been the wilderness. This elasticity, this movement, this necessity of finding new solutions, made it far more easy and natural that improvements in the so-called "practical" installations should find favor than could be the case in Europe, where every change meant the overthrow of some long-established custom. Europe was, and still is, "custom-bound." Sociologically it is important to note that even the French Revolution, which Mr. Buckle calls "the supreme event in history," was actually in its immediate outward effects, largely a Parisian affair; the bulk of the population of France held largely to its established ways of thought and habit.

For many years the taunt of the American tourist,—I speak of the superficial type,—was well known: "Europe may have the Louvre, but give me my bathroom with its modern plumbing." Well, the genius of the Louvre and the genius of the bathtub are not, necessarily enemies; and the present movement in housing and construction in Europe is going far to prove this. The great



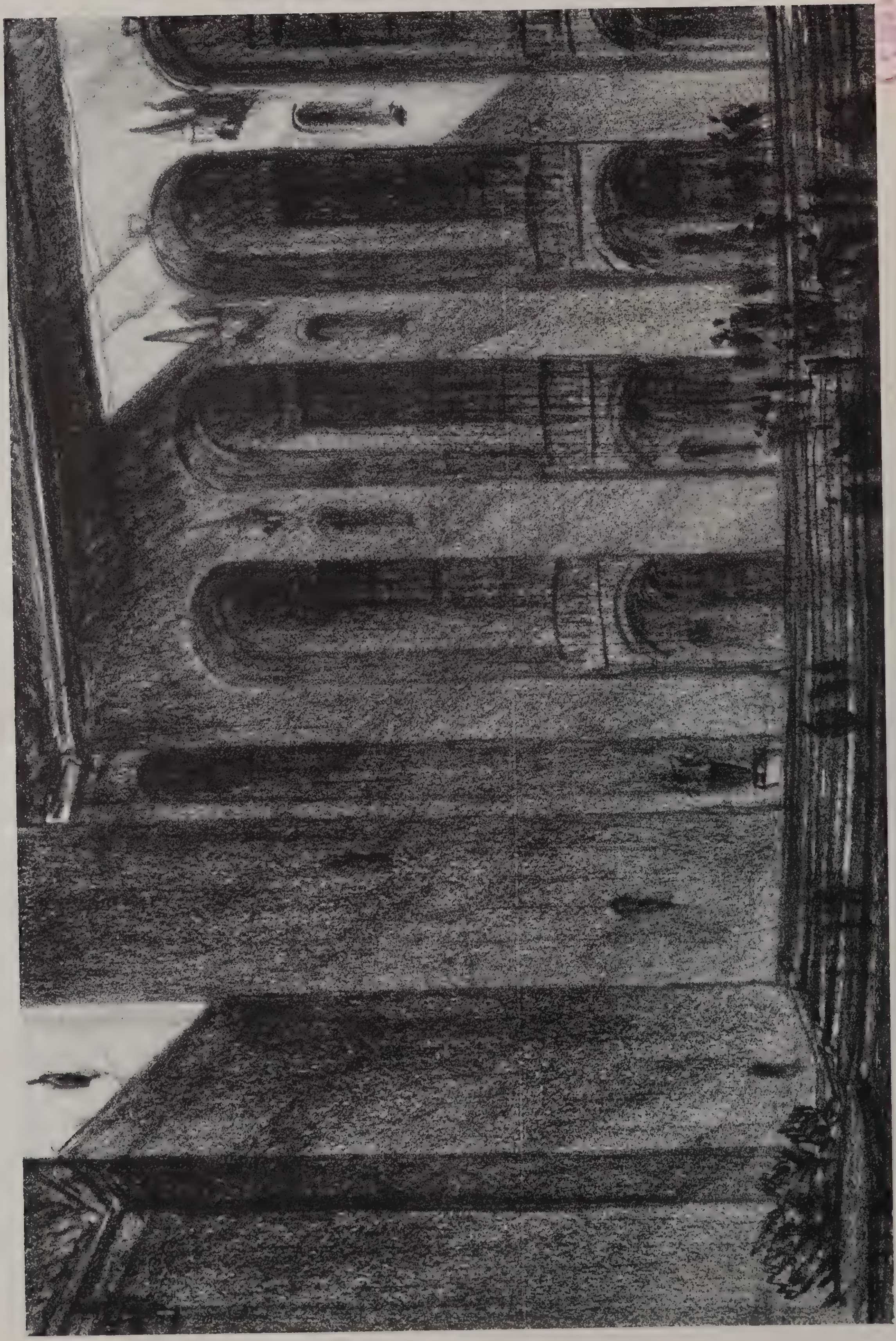
ONE OF THE SIDE ENTRANCES TO THE OLYMPIC STADIUM, AMSTERDAM

Brick Construction



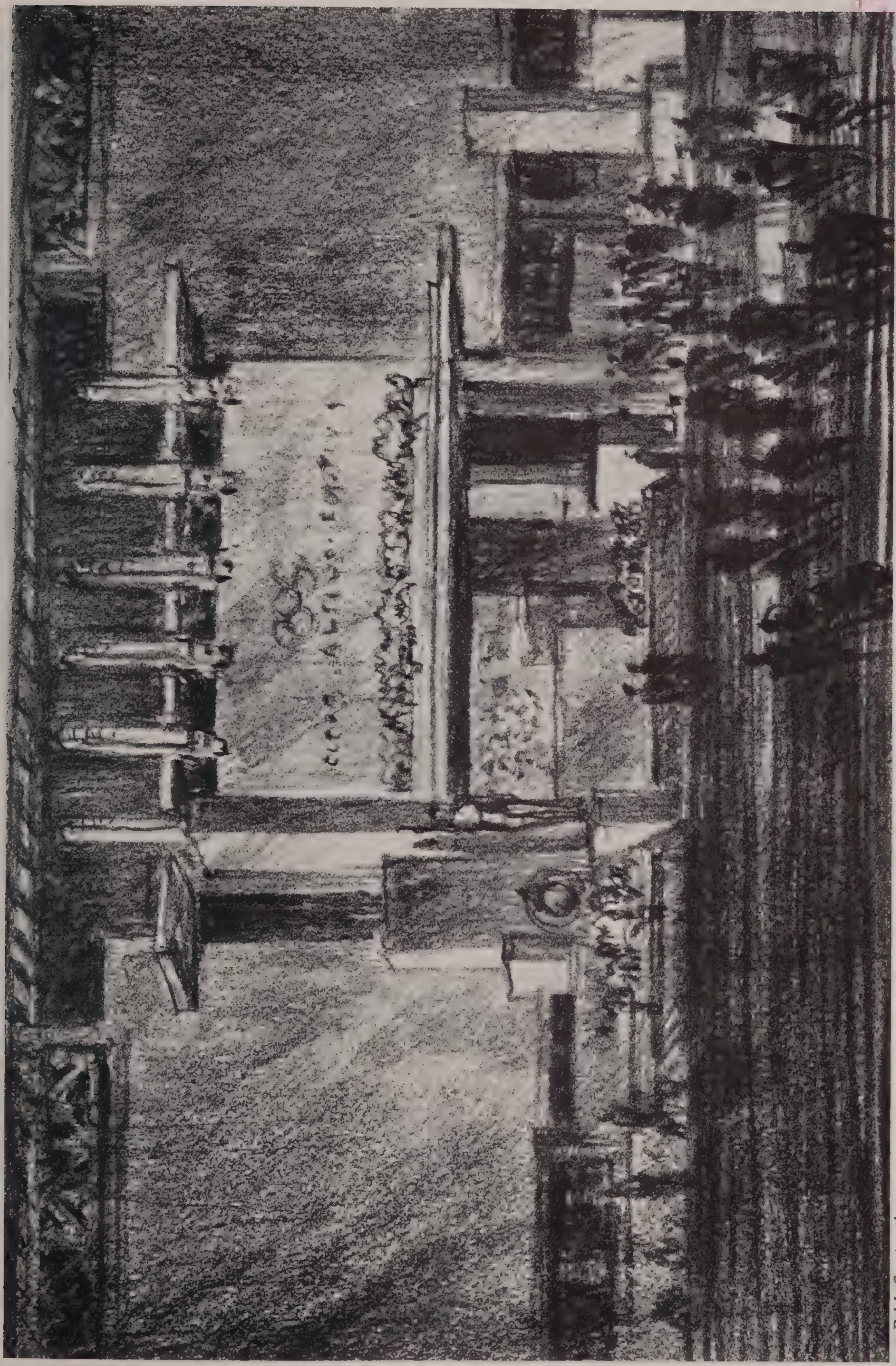
Effective Mass in Concrete

NEW MOTION PICTURE THEATER IN THE OLD TOWN OF NUREMBERG



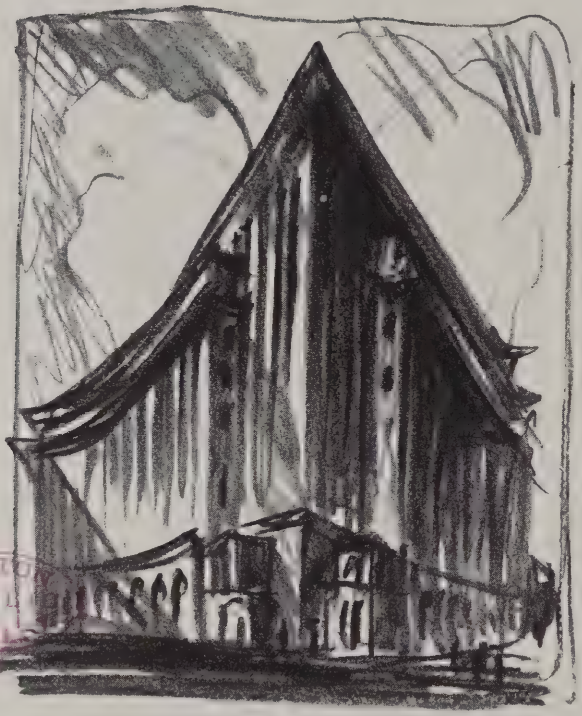
Red Brick Construction

COURTYARD OF THE TOWN HALL, STOCKHOLM



Brick Construction

MAIN ENTRANCE TO OLYMPIC STADIUM, AMSTERDAM



Mauve Colored Brick
"Chilehaus" in Hamburg

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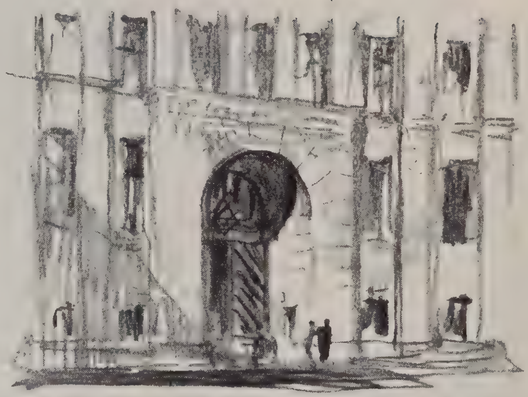
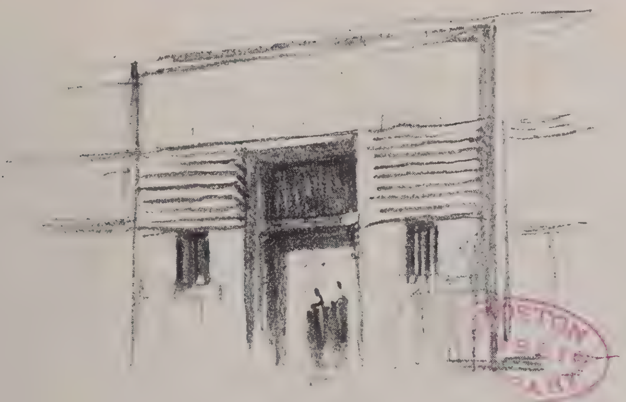


Cement Construction
Doorway to New Post Office, in Stuttgart

change, which came easily in this country and with more difficulty in Europe, was without question due principally to the perfection of the means of industrial production which the nineteenth century brought forth. In certain European countries, such as Germany, the scrapping of eighteenth century methods of production made more rapid advance, doubtless, than was made in England and France. And this industrialism has actually forced the older Europe to accomplish, in a relatively short time, somewhat of the transformation which extended over many years in this newer country. Even those among us of moderate age may recall the subsequent steps in the improvement of lighting. As a boy, you lighted your way to bed with a candle; the footlights in the theaters were (in the country) kerosene lamps; only such important buildings as the town hall could boast of having gas lights; the street corners were brightened by hissing arc lights; and, finally, the incandescent electric light proclaimed its ubiquitous supremacy. Modern Europe has, in its architecture, figuratively at least, leaped from the candle to the electric light without intermediate stages.

A review of the buildings built throughout northern Europe during the past 20 years brings to us sharply the realization that, under the ægis of modern construction and modern sanitation, Europe is making greater progress, relatively, than is being made in this country. The work of the later architects in Europe, and especially of the protagonists in the development of the "modern" phase of architecture, has taken, as the expression goes, "the bull by the horns." They have consciously and effectively brought forth works of originality and genius, and they have done this because they have, at their best, succeeded in freeing themselves, not from the spirit of all precedent architecture, but in freeing themselves from the special vocabulary which, under the academic regime, had taken so strong a hold. It is this very expression of freedom which is least understood in America. In the minds of most of those who in any way follow the developments of the arts, the essence of protest which underlies all the special movements such as futurism, cubism, imagism,—and what not,—is not clearly perceived. The bizarre qualities of the work are noted, the hideous procession of monstrous emanations is observed,—but the significance of the protest escapes. When one, trained in the ancient usages of Greek, Roman and Renaissance architecture with their standardized forms, comes upon a collection showing examples of "modern" work, he suffers, generally, from shock. These buildings are to him revolting rather than otherwise. There is, of course, nothing strange in this; whatever is new shocks. And it is not necessarily a measure of praiseworthy perspicacity to join in lengthening the procession of things that are new; error and sham can be as "new" and "modern" as their opposites. What is wanted is the open mind.

Perhaps there is room for disagreement, but I would suggest that, so far as "modern" architecture is a valid and conscientious expression of the architect's sense of design, there are no "new" principles involved. This very statement may, perhaps, seem to beg the whole question, because, if we were all as wise as Montaigne, we might question whether there



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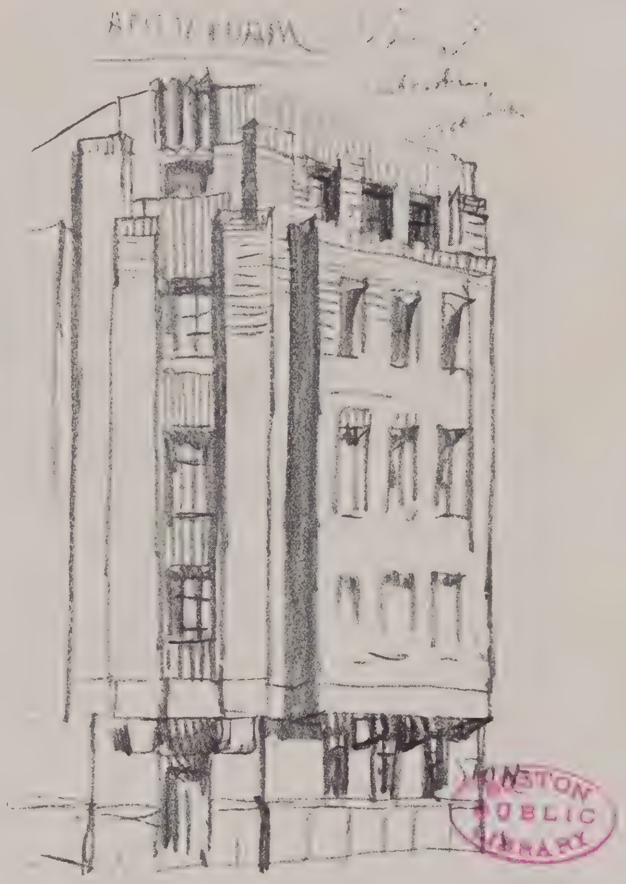
Combination of Stone and Metal

Modern Doorway to an Office Building in Berlin

are any "principles" of art or architecture at all, save those quasi-principles which we learned at school, even as our forefathers learned other "principles," only to renounce them in favor of still other "principles." Yet, one may hazard the suggestion that in the architects in Europe who have striven in their modern architecture for a pure expression of the conditions imposed by the exigencies of modern engineering there is, unquestionably, one outstanding thought,—or principle, if you will,—and that is that the design of the building should be evolved from the matrix of these conditions,—and these conditions are always local and special,—rather than that the design be achieved by trying to fit the conditions to the limitations of an architecture which belonged to a day that is dead. Even this generalization has its sharp-pointed restrictions. For it is possible to hold that the instant we admit the right of decorative forms to enter into the final expression of the work, we are admitting a factor which destroys the validity of the generalization. If we are to express modern requirements,—economic, constructional and other,—why should we search for a decorative expression at all? And if it be admitted that the decorative sense is, like all other senses, a part of Nature's self, and therefore entitled to recognition, where are we going to draw the line as to what part it may play in our design? Just because a porch roof may be supported by cantilever construction, is that an insuperable reason for so expressing the porch? Suppose the porch "looks better," as the saying is, with pillars,—shall we scrap the pillars just because we know that there is a cantilever buried in the hidden depths of the construction? And if we do use pillars, are we playing false or not? Must we, as subject to the Great Necessity, learn to consider the cantilever construction necessarily, —under these conditions,—decorative? Close questions these,—and who shall answer them? Not I, and, my masters,—saving your grace,—not you.



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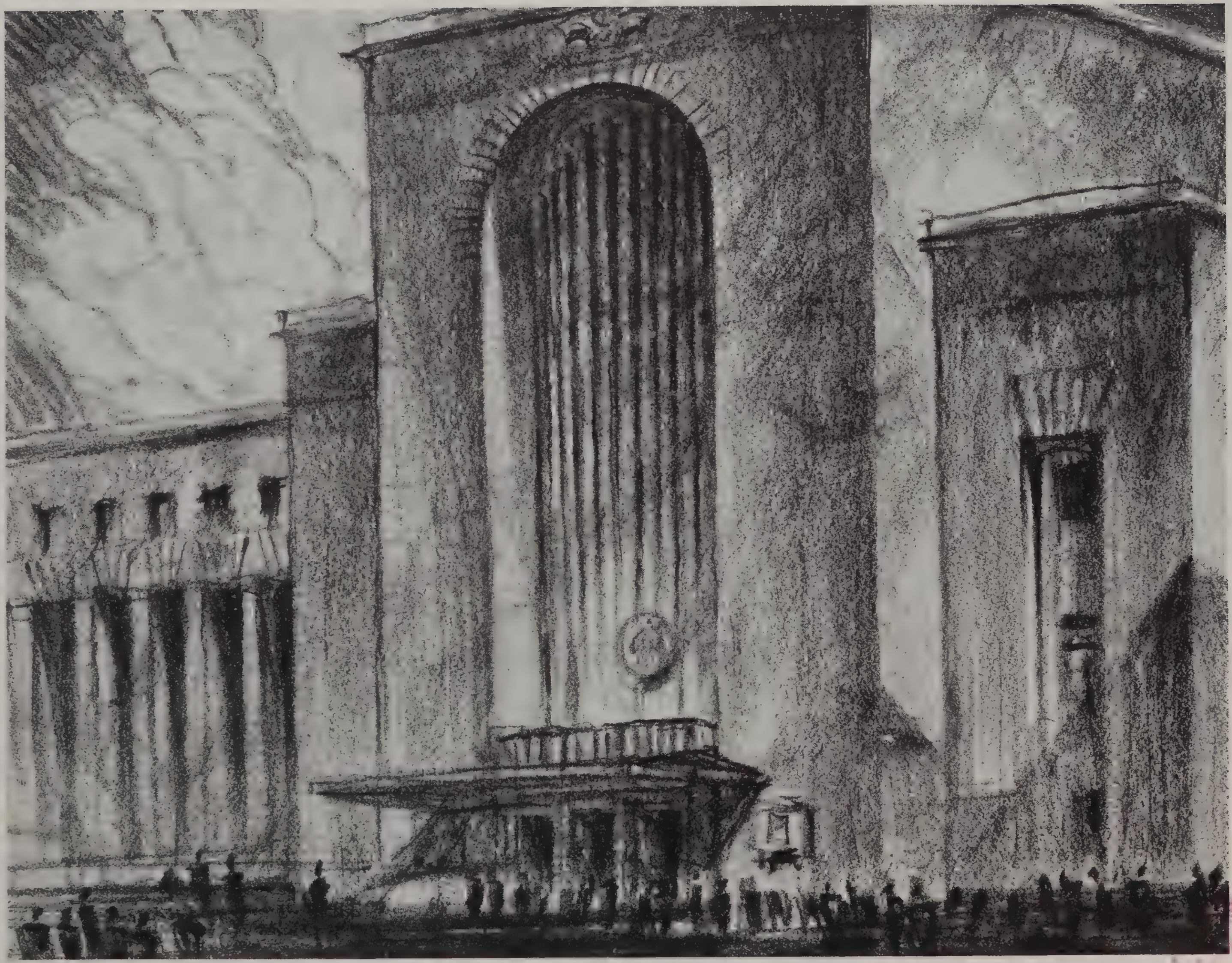
Treatment for a Corner Building in Amsterdam

The illustrations shown in these pages present sympathetic sketches of some of the buildings which have impressed Mr. Keally as most worthy examples of recent work. These buildings may be characterized, I am sure, as showing sincerity of purpose and ardent æsthetic desire. Their originators had, I feel certain, no desire to be bizarre; they have endeavored, simply and without equivocation, to let the design of their buildings be governed by their essential functions. Of course, there is nothing new in this attitude. Guadet and his long line of predecessors at the *Ecole* in Paris have taught the same gospel. If there is any difference in the methods of procedure between the "modern" architect and the architect of the older tradition, it is this,—that the academic architect works out his plan always bearing in mind certain classic proportions, so that his points of *poche* shall, when the elevation comes to be drawn, give his wall openings, his arches and his columns the sanctified academic proportions, whereas the "modern" architect tries to forget this vocabulary and lets his wall openings take care of themselves, feeling confident that if his plan can meet the construction and functional needs, he can find a way to make his wall openings and supports attractive, whatever their proportions may be. I do not mean to imply that his thought process



Stone Construction

NEW RAILROAD STATION AT STUTTGART

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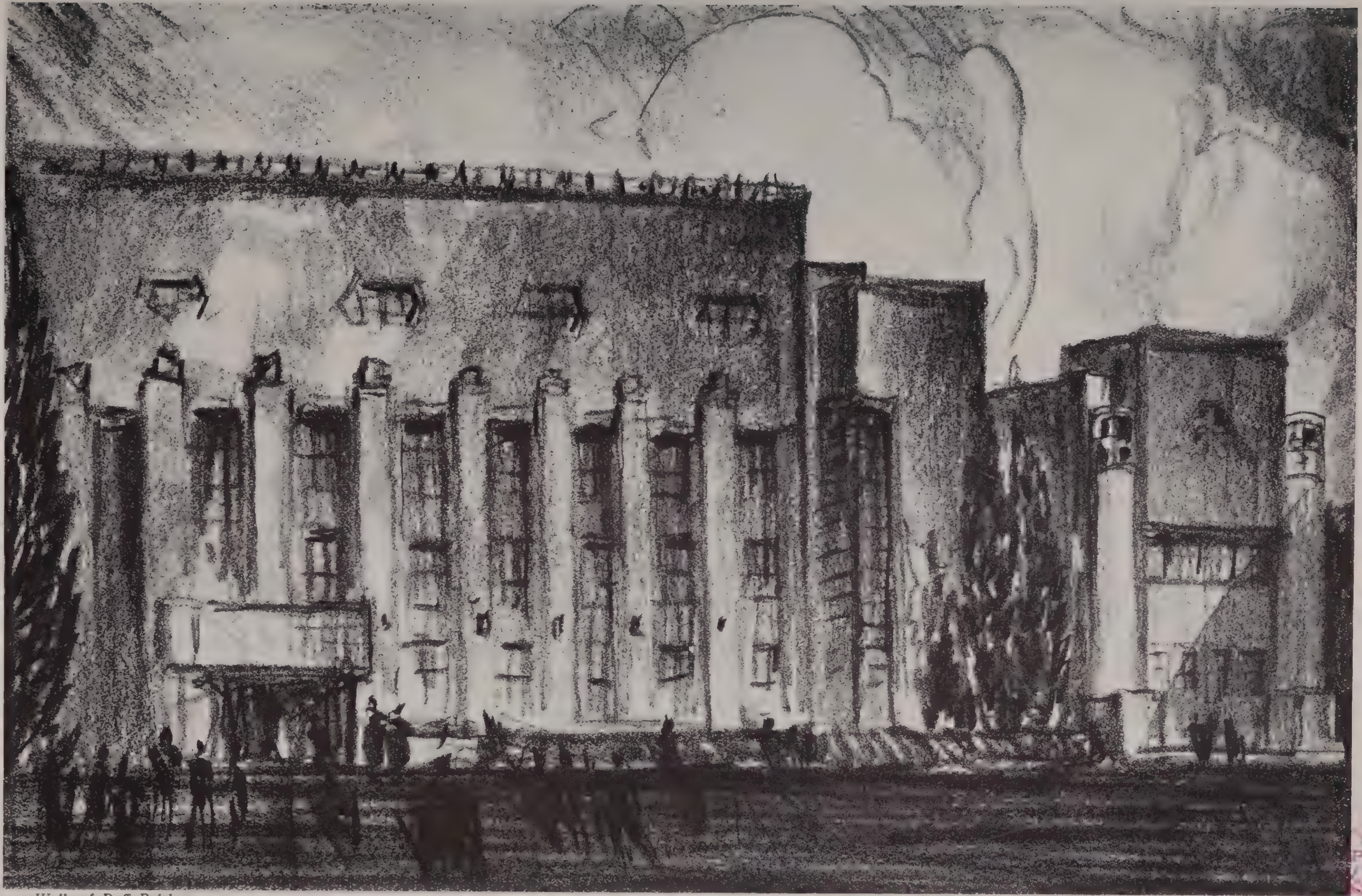
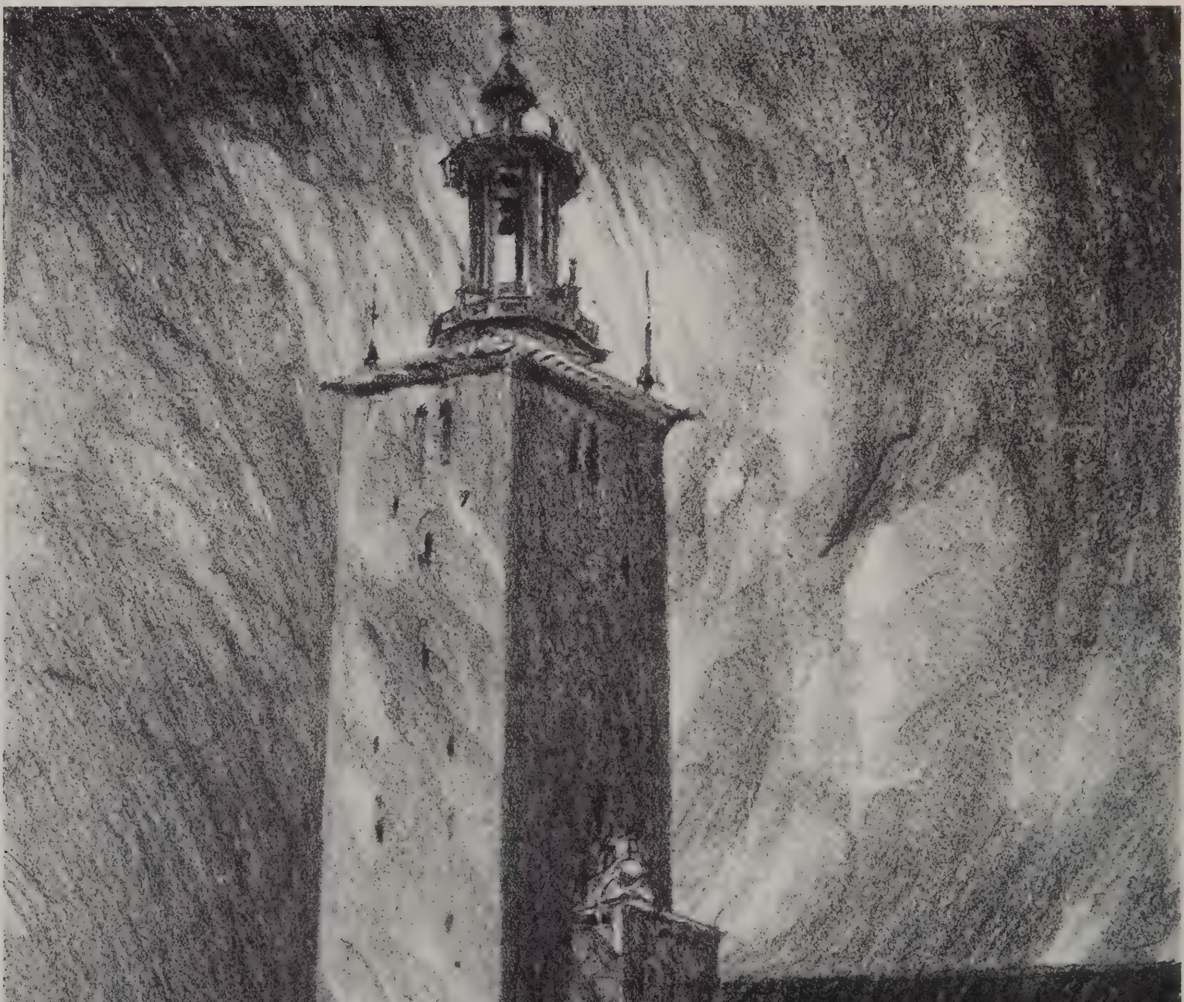


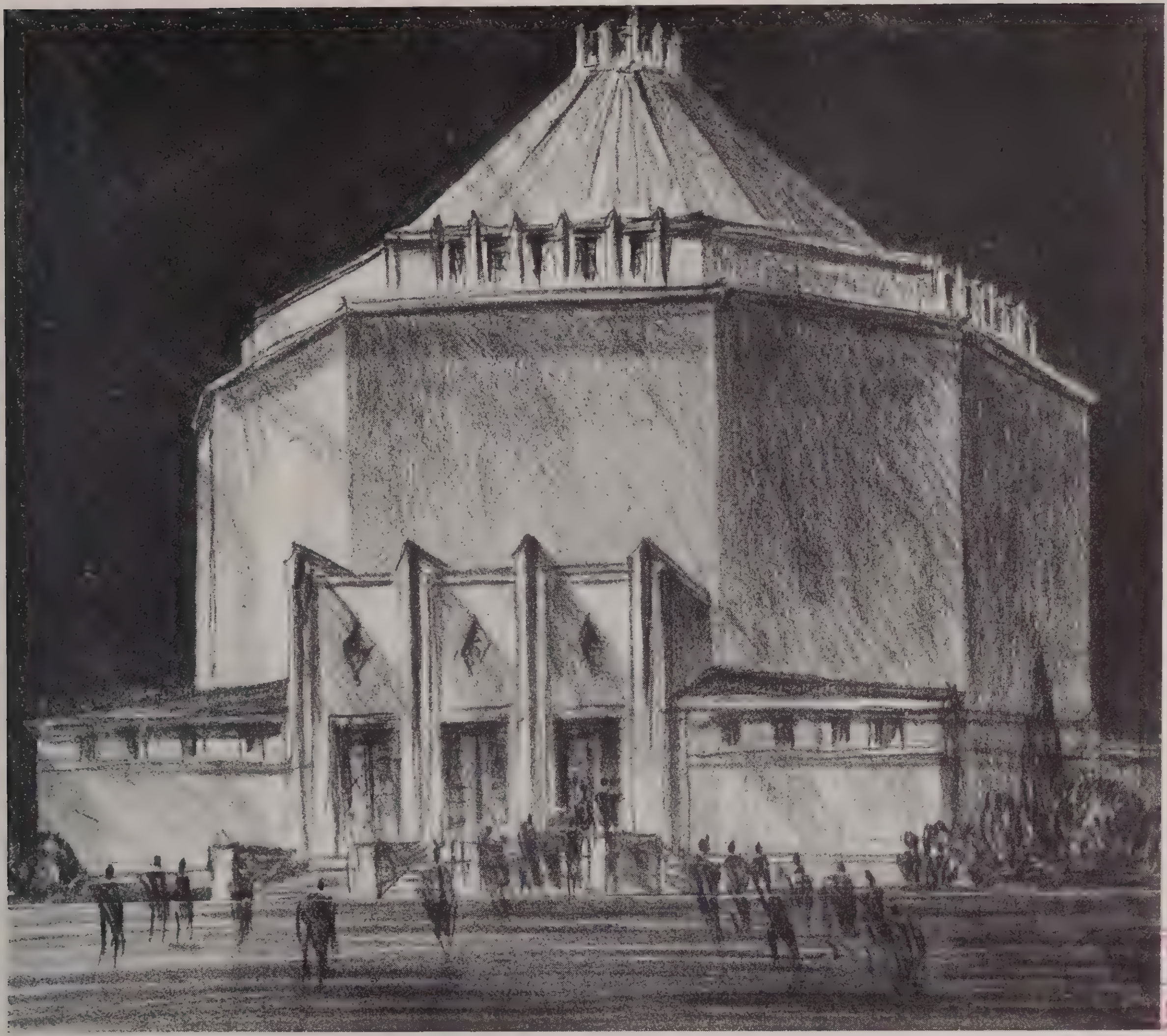
Walls of Buff Brick

A MODERN HOSPITAL IN AMSTERDAM



Red Brick

TOWN HALL, STOCKHOLM



Cement Building

New Planetarium in Leipsig

is quite helter-skelter; in terms of his genius he may visualize his section and elevation as he works out his plan, but, again in terms of his genius, he visualizes new solutions for these elements.

The architects whose work is characterized as "modern" have chosen the path which seems to them to lead to freedom. They are willing to consider any solution, yet, being intelligent, they,—or some of them,—are not willing to accept any solution. They may originate new forms and new disposition of masses,—but this type of magic is not original with them. The originator of these forms, always in terms of his æsthetic genius, may produce results which are pleasing to his taste and to the taste of certain others. How many he pleases or displeases is irrelevant. The empire of art is an organization in which the ruler and the ruled are one. The instant, however, he consciously formulates his art in canons, or as soon as the canonists arrive to dismember his work, a style is founded, his work is academized, and all the beggaring limitations grow into a school of art in which the disciples desecrate the memory of their master by imitation of his manner,—losing sight of the fact that to emulate him they should be different from what he was.

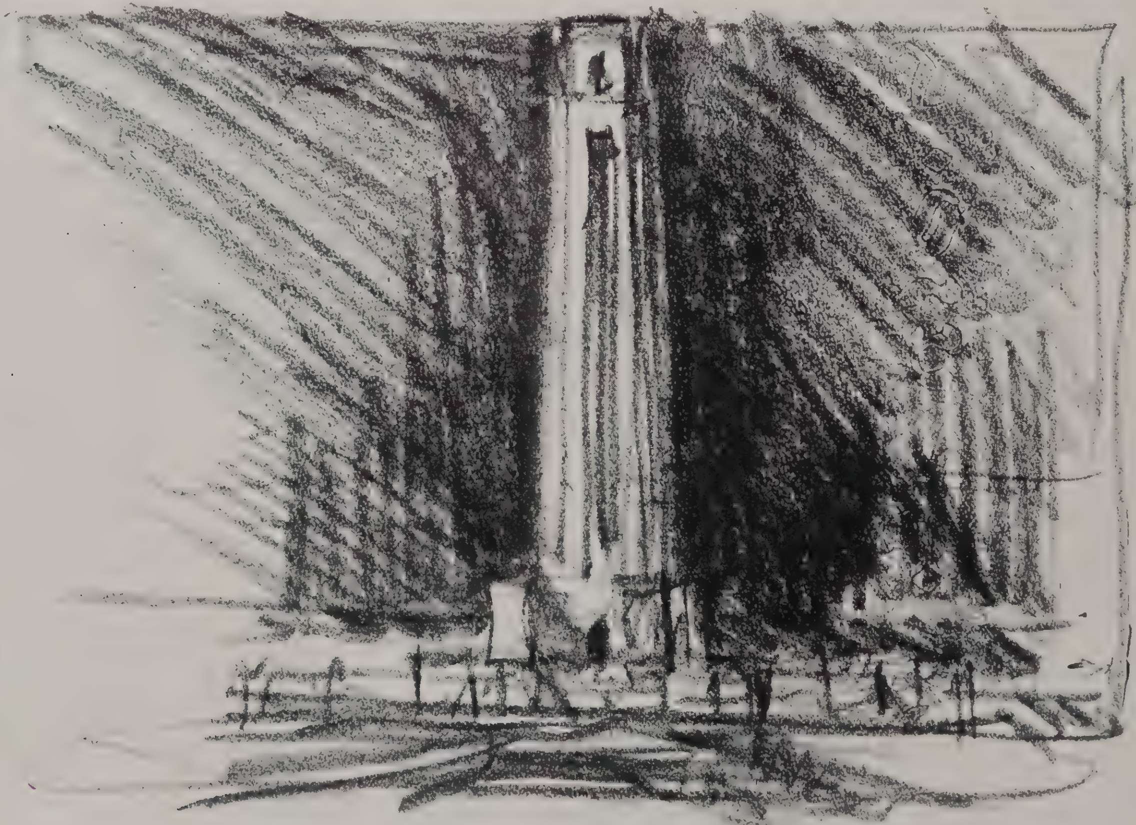
Well, what of it? A great deal. Have we, under the regime of our industrial Frankenstein, time in which to be original and different? Under the actual pressure of our modern life, how many architects can afford to take the road to freedom? How many, economically hedged in by the complexities of their professional life, can afford to differ? We see about us today many architects who are doing what is called "modern" architecture,—but, as a matter of fact, they are more or less servilely copying their European *devanciers* just as their predecessors, decades ago, copied Cæsar Daly. Is there any difference of attitude?

I do not know whether or not in the distant future our economic conditions will so change as to permit a more ample freedom, nor have we any

All Metal Front
A Perfume Shop in Paris

A Monument in Hamburg

assurance that the architect of the future will have either the desire or the power to take advantage of a larger freedom. That they may is, naturally, the hope of all men who believe with Professor Bury, in the theory of progress. As the situation stands today, we may be cheered by the fact that some architects, like some philosophers, manage, in spite of the crushing conditions of our daily life, to think and dream,—free, in some way, from the inhibitions which master the great majority.



Suggestion for a War Memorial

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HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

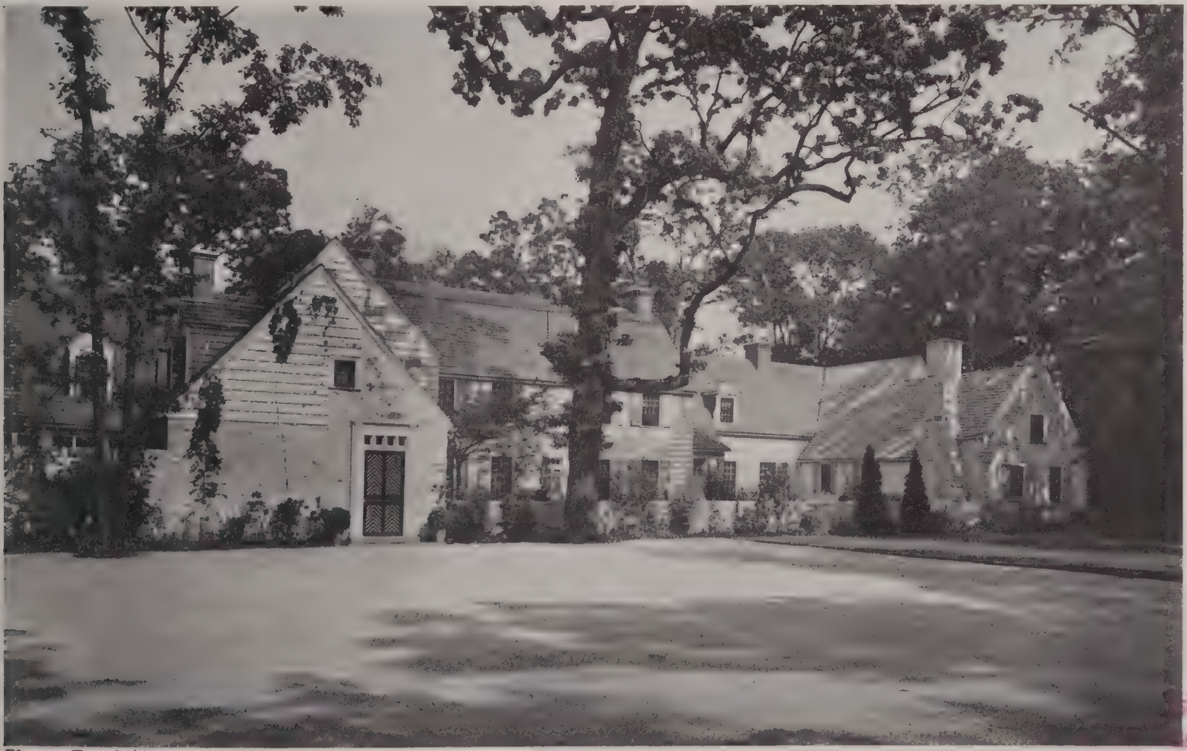
DAVID ADLER AND ROBERT WORK, ARCHITECTS

BY

MATLACK PRICE

OF this house at Lake Forest for William McCormick Blair, one might well say that it has achieved all the storied charm of a venerable ancestral home, traditioned through generations, with all the comfort of the modern country house, studied to the last degree for today's most exacting demands for convenience. For this type of house we dwellers on the Atlantic seaboard must be conceded to be intimately appreciative. We must be conceded to have traditions, to sense the authentic architectural expression against the counterfeit, to be, perhaps, narrowly over-critical of the result when we see a house built in the image and likeness of our cherished Colonial in a spot sufficiently far west to have been virgin forest, not even a frontier, when Boston and Newport and Philadelphia were important cities of the colonies. But here is a piece of architectural handiwork that re-creates our Colonial mannerisms of the Atlantic seaboard far more intelligently and with more real authenticity than any but the best of our own efforts. It derives in part from Pennsylvania and in part from New England, with a third element of its own personality which unifies it and makes it a fine piece of work in its own right, supposing it to have had no definitely stylistic origins at all.

The architects have given us an excellent demonstration of the truth that the true old Colonial houses, for all that they developed certain identifying traits, were by no means all alike, and certainly not all "typically" Colonial, if we take typical as meaning built on a formula. Many of the finest houses of the colonial period were built on no formula at all. Many were remarkably individualistic, and grew from generation to generation into structures of rambling charm, with successive additions. Such a one this Blair house might well be. The rough-cast stonework, and the split stone, unwhitened, suggest the older houses of Pennsylvania, where the Welsh settlers brought with them their ready skill as stone masons. The gambrel roof of the main mass of the house has a New England manner, from where, too, might have come the hand-split shingles. These, by the way, illustrate the importance of thoroughness in any adaptation of a historic type. It is not enough to copy forms. The materials of the original, as well, should as nearly as possible be simulated. And the hand-split shingles are



Photos. Trowbridge

Entrance Front
House of William McCormick Blair, Esq., Lake Forest, Ill.
David Adler and Robert Work, Architects

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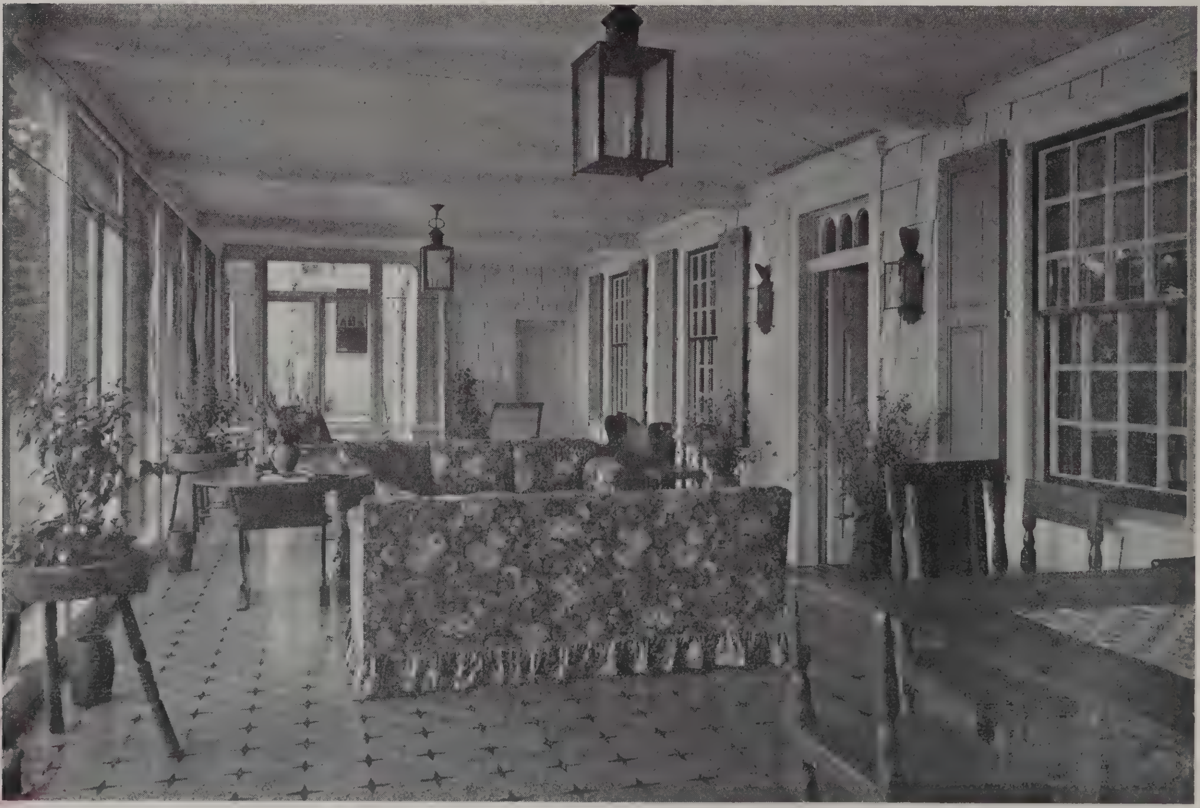
exactly the right thing here not because (merely for a tricky effect) they are hand-split, but because they give precisely the effect of the old houses for which such shingles were the only kind obtainable. They have the irregularity that all hand-made things possess, and that is an essential factor in recreating any old type of building.

There are about this house few of the obvious things that many lay observers with a smattering of architecture would expect to find in what they would call a "Colonial" house. There are no "pillars;" there are no spindle railings; there are no fanlights or Palladian windows. For all of these omissions it is more truly Colonial than if it had all these things which came in later with the more sophisticated Georgian period. And this is equally true of the interiors, which the writer feels qualified to appreciate fully because of a summer spent in making measured and full-sized drawings of the interiors of several pre-Georgian manor houses in Rhode Island. In all this early Colonial interior detail there was a peculiar kind of primitive purity unlike any of the more scholarly work that came later. The scale was more generous; panels were sunk deeper; the mantel shelf had not come to be an inevitable part of the fireplace; there was a naïvete that was never clumsy and never too stylized. And much Georgian work, even when it is very beautiful, loses in charm what it gains in perfection.

This early Colonial interior woodwork has never been better understood or better done than in these Lake Forest interiors. Simple mouldings frame the fireplaces; simple cornices finish off the paneling, and the divisions and proportions of the paneling have the same fine simplicity. The very broad panels are essentially characteristic of the early work, and so is the generally large scale of the mouldings and the panel bevels. There is much work like this in the earlier Pennsylvania houses, and some also in New England, particularly in Rhode Island. The paneling, and especially the double pilaster caps in the dining room, are almost identical with the paneling and pilasters in the parlor of one of the finest old manor houses in the Narragansett part of Rhode Island. Another identical device, and one very characteristic of early Colonial woodwork, is the breaking out of the cornice over all pilasters and keystones. Inside or out, wherever this house departs from definite precedent, it departs in a thoroughly logical and consistent manner, because the architectural technique is consistent. The whole house is a monument to consistency, and nowhere does there seem to be any straining for effect, no forced issues. It all looks as though



Living Porch

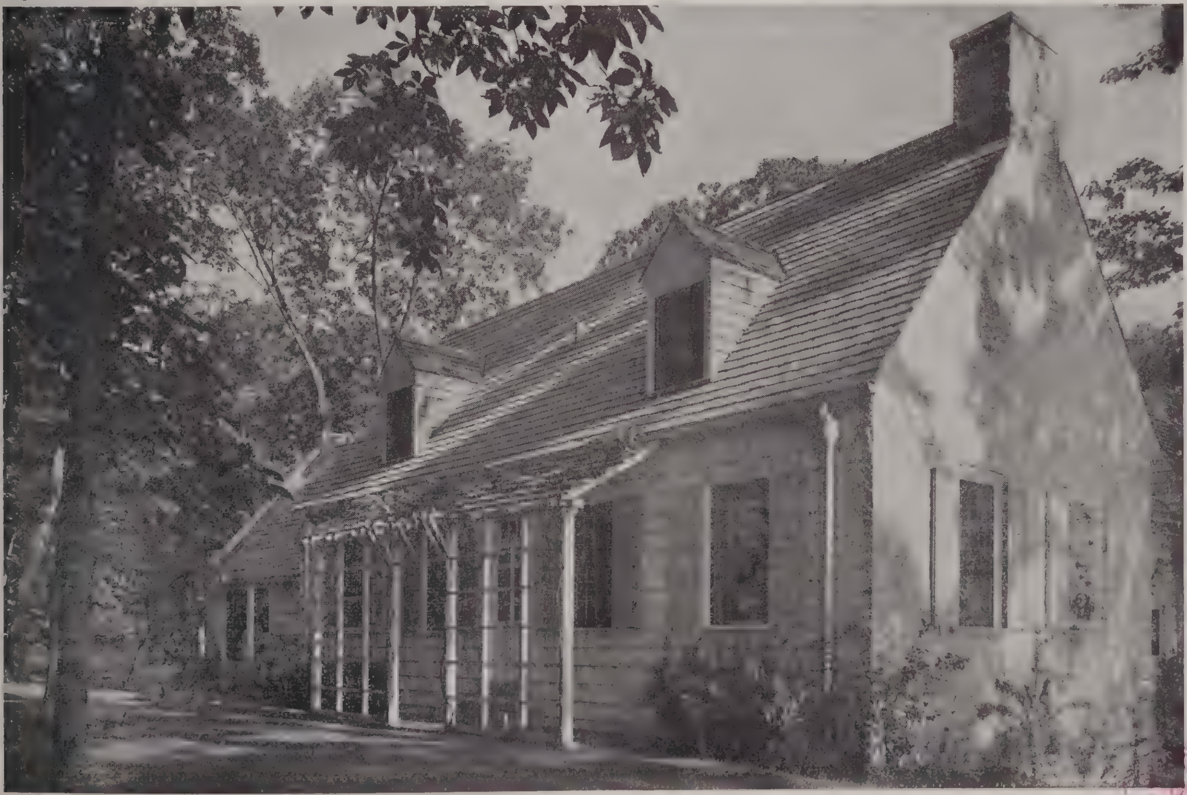
House of William McCormick Blair, Esq., Lake Forest, Ill.

David Adler and Robert Work, Architects

it has been done easily; there is no feeling of effort, of painful re-construction from books and plates, and this is a trait of the best architecture there is,—and the best art.

Everything about this house seems to be in perfect keeping with everything else, and essentially in the spirit of its time,—yet there is no feeling of conscious stylization. The sense of the beholder is the same he experiences in visiting an actually old and architecturally fine house,—a sense that nothing could have been done otherwise, and that nothing that could be done would add any charm or any manner. More likely it would destroy rather than improve. There is more in architecture than form. More, even, than manner and technique, which may have to do with modifying form, with giving form different inflections, different gradations of meaning. Architecture, thus refined, thus drawn away from material values, begins to express values psychological. This house, for instance, gives the impression of a place of old and known abode, a place created by and a part of gentlefolk who lived here, who entertained here in a more leisurely age. Here are rest, and surcease from whatever phases of the immediate age we may find uncongenial; here is room for old ideals of graciousness and courtesy; for a kind of life that is both formal and informal,—and quietly well bred in all its expressions and all its implications.

Refinement of detail and beauty of woodwork are evidenced quite as much in this splendid example of early American Colonial architecture as is found in the more stately and pretentious examples of the later development of this style in Virginia and the Carolinas. The use of many carefully selected and harmonious colors in the painting and furnishings of the various rooms also adds to the individual charm and character of this house. Unfortunately, the many illustrations which accompany this brief description fail entirely in giving any adequate idea of the depth and harmony of the colors used. The many different types of fireplace designs, the well proportioned small-paned windows and the comparatively low ceilings of all the rooms add to the atmosphere and appearance of genuine antiquity, which this house possesses to an unusual degree. The plan is interesting in its arrangement, rambling over a great many square feet of property. Although all of the important rooms are of substantial size, there are many delightful small rooms for cards, writing, reading and quiet conversation. The owner is indeed fortunate to have secured the services of architects so sympathetic and so successful in the creation of one of the most individual, consistent and interesting country houses ever built in this country.



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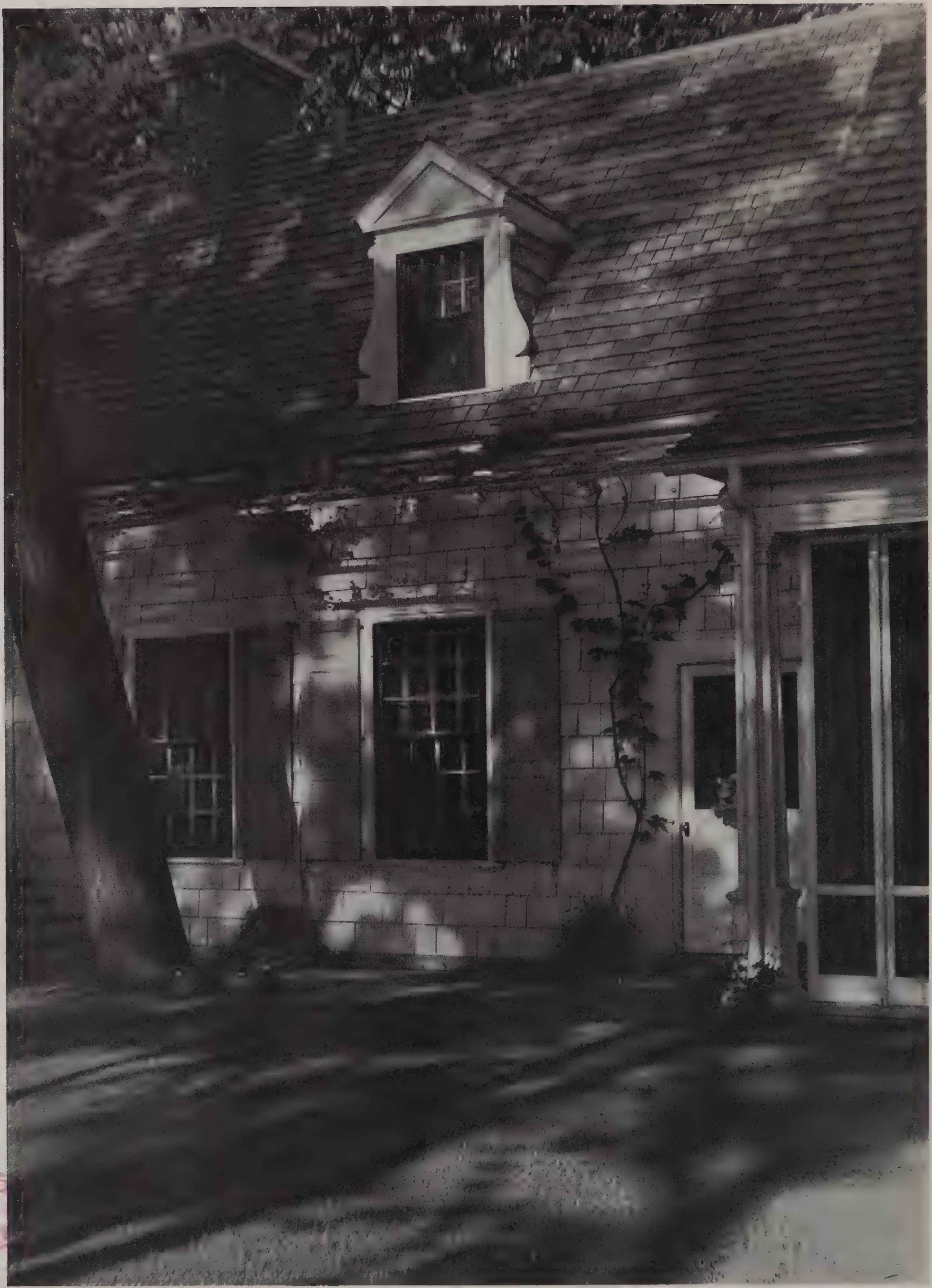
South Wing
House of William McCormick Blair, Esq., Lake Forest, Ill.
David Adler and Robert Work, Architects



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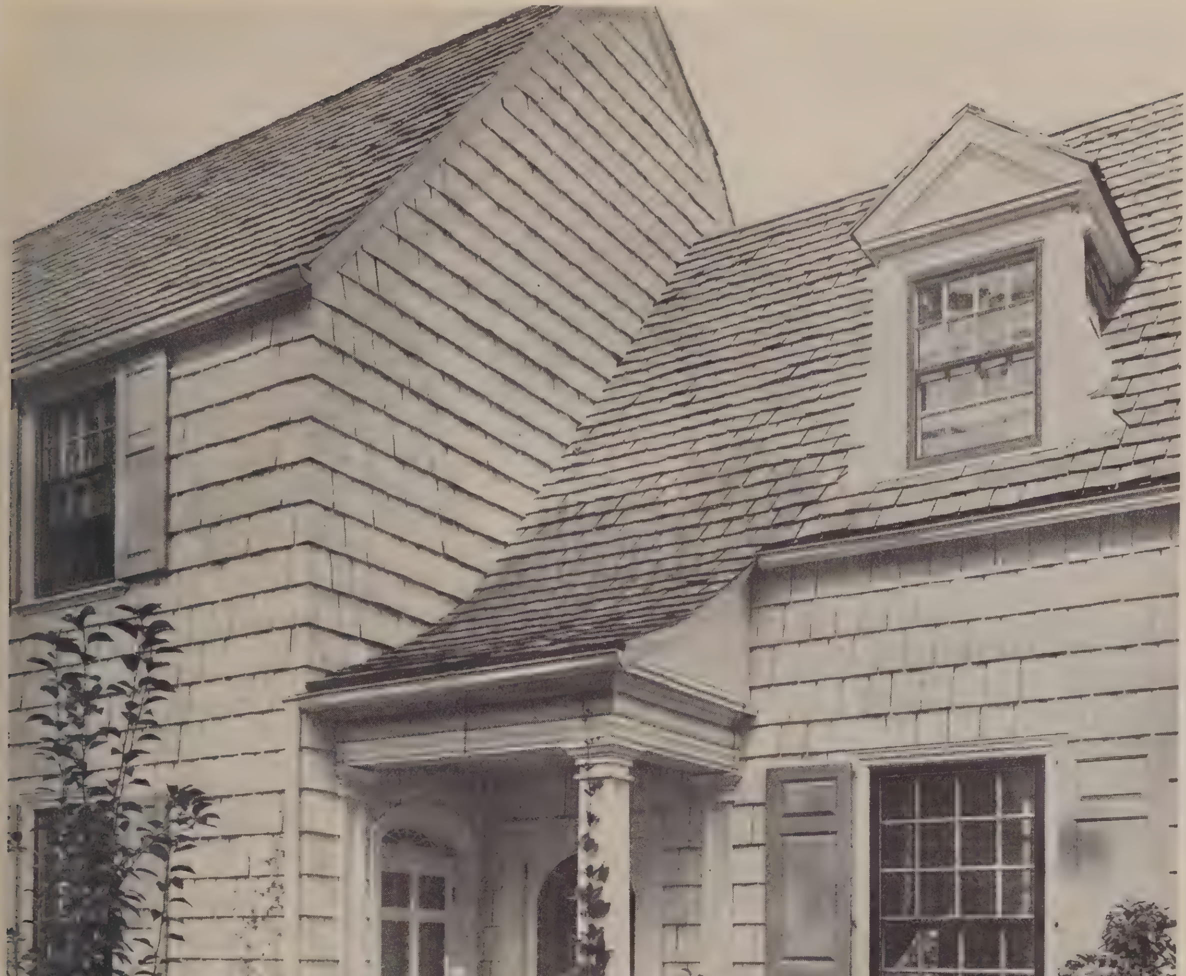
DETAIL OF THE EAST FRONT
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

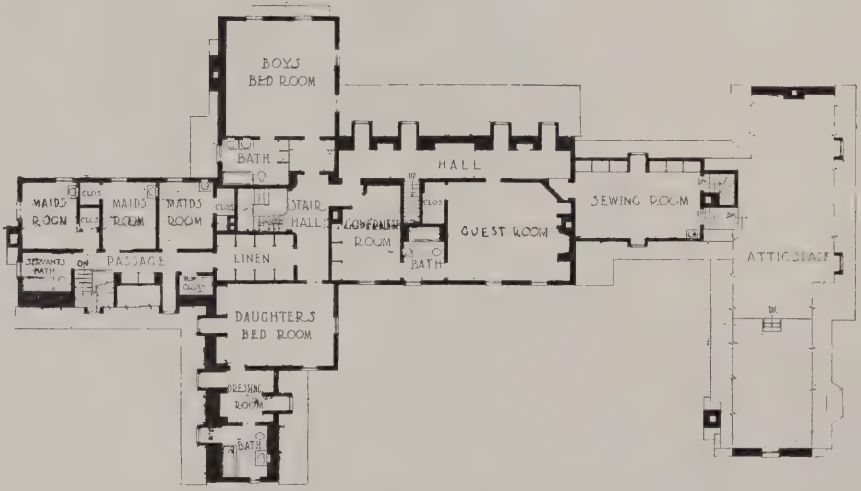


Plans on Back

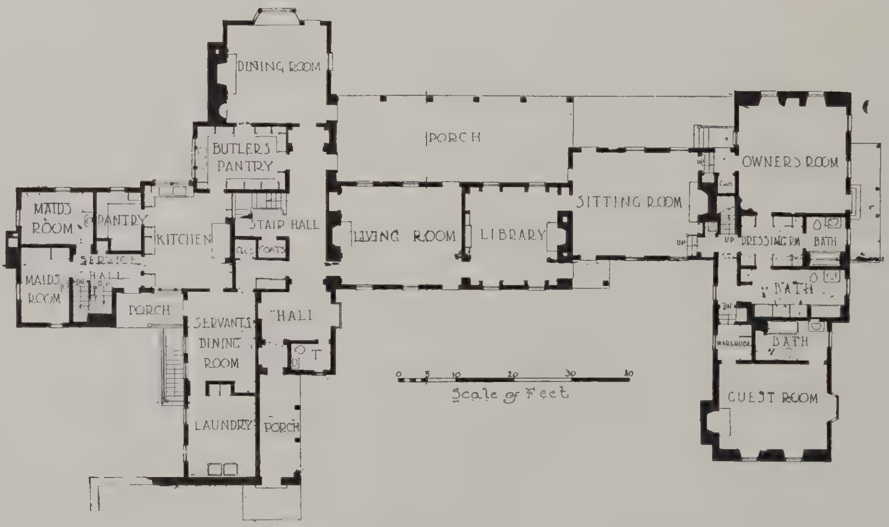
GARDEN ENTRANCE

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

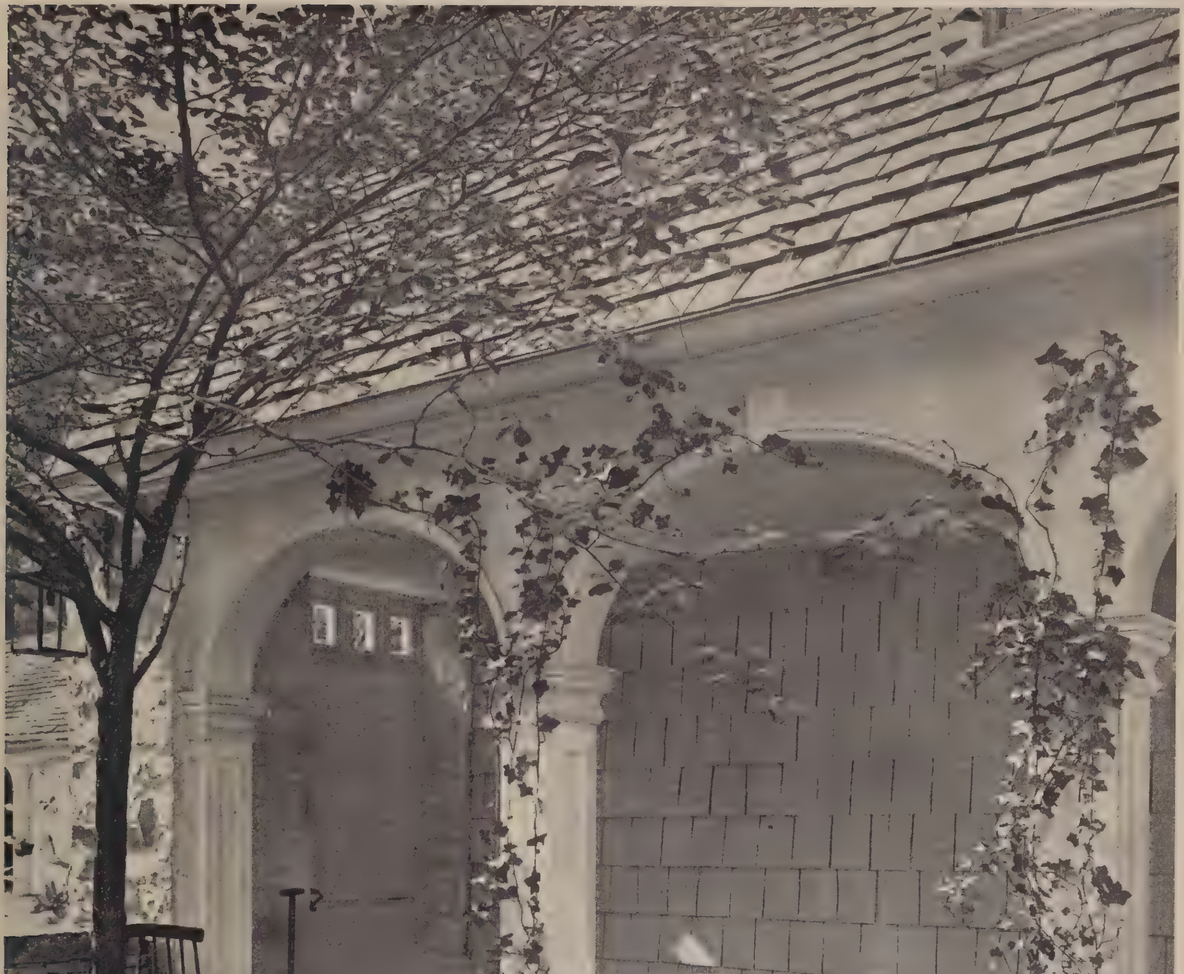


SECOND FLOOR



FIRST FLOOR

PLANS: HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

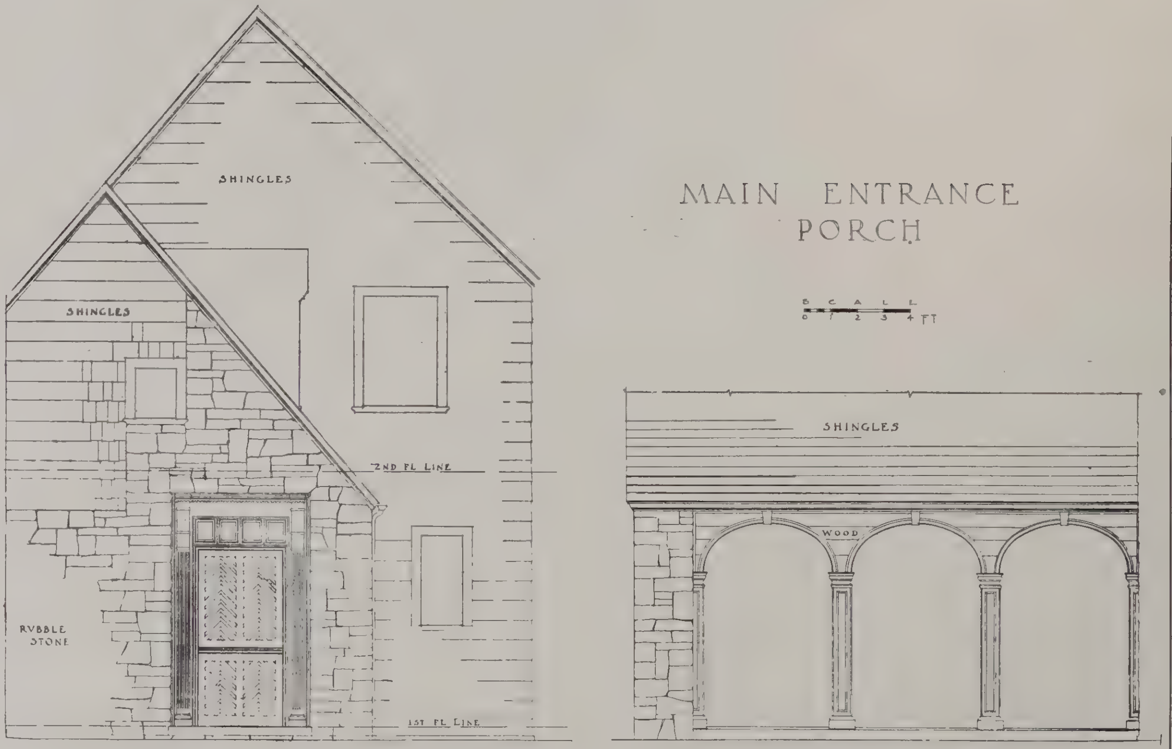


Details on Back

ENTRANCE LOGGIA

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



MAIN ENTRANCE PORCH

WEST ELEVATION

SOUTH ELEVATION

DAVID ADLER AND ROBERT WORK, ARCHITECTS

DETAILS, HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

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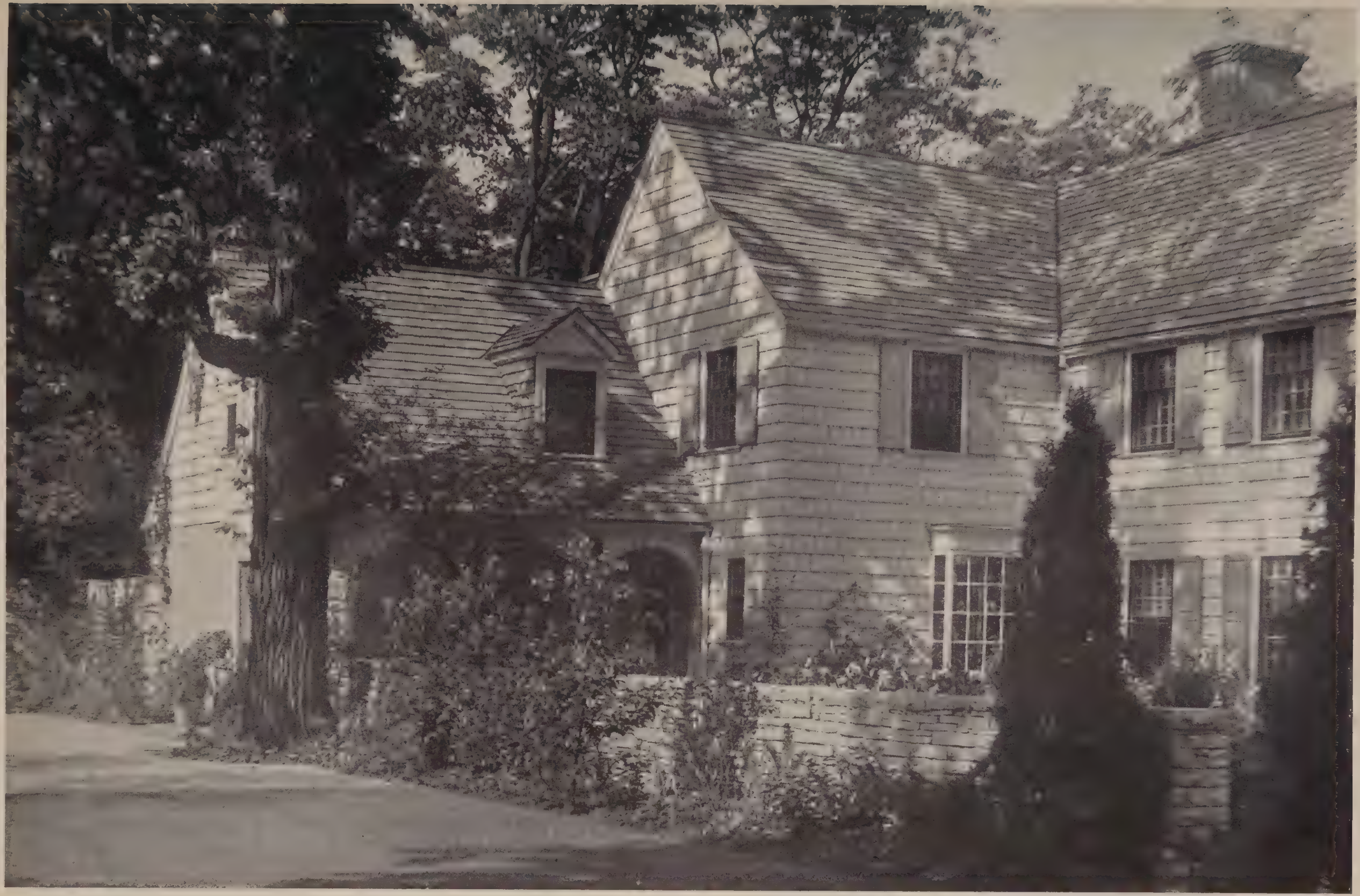
The ARCHITECTURAL FORUM DETAILS



ENTRANCE FRONT

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

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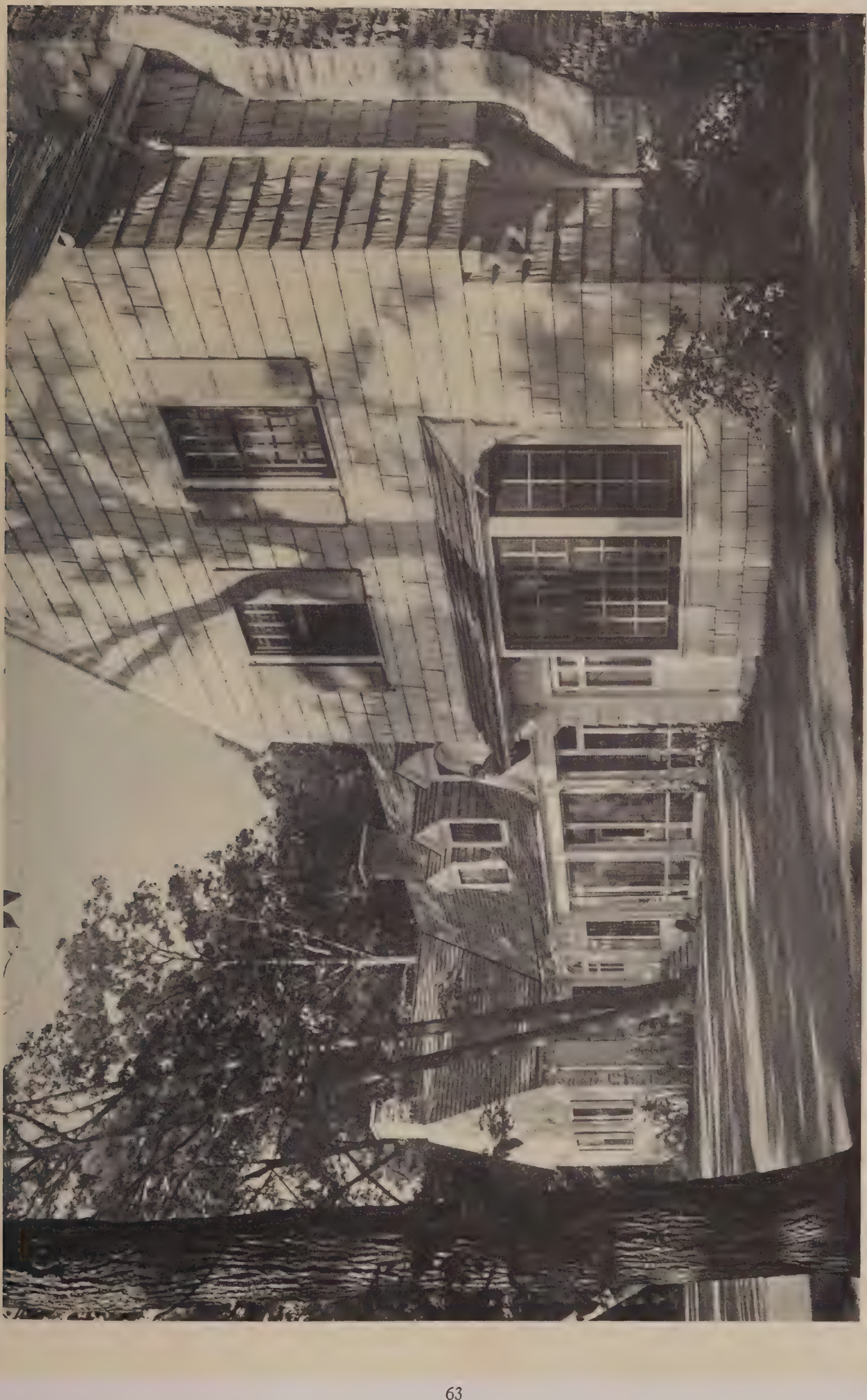

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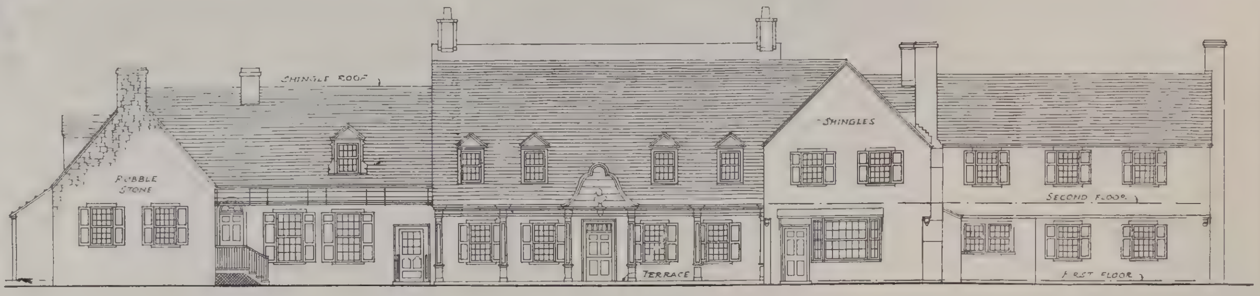
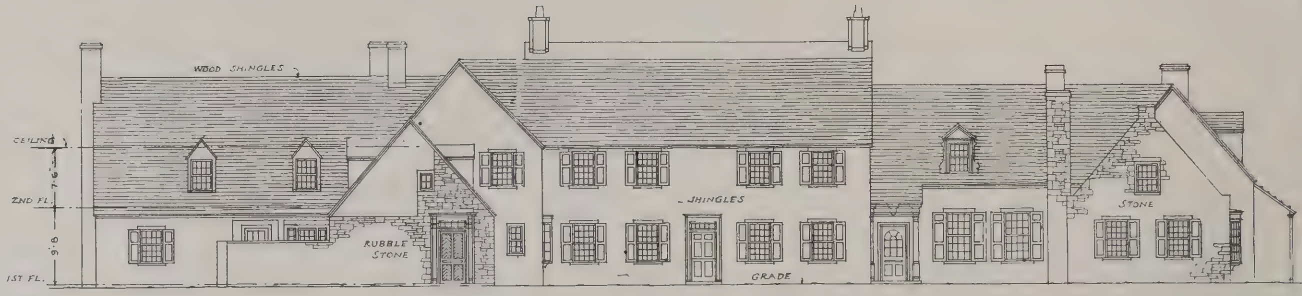
EAST FRONT

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

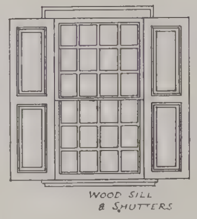
DAVID ADLER AND ROBERT WORK, ARCHITECTS



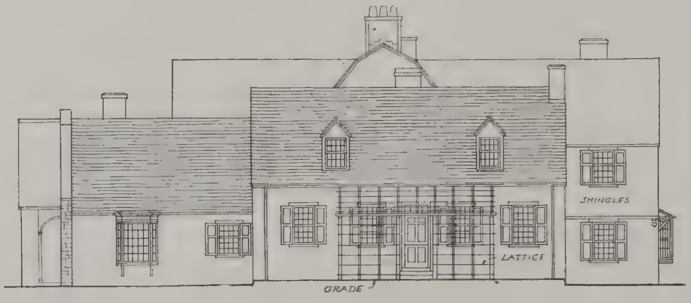
EAST ELEVATION



WEST ELEVATION



SHUTTER DETAIL



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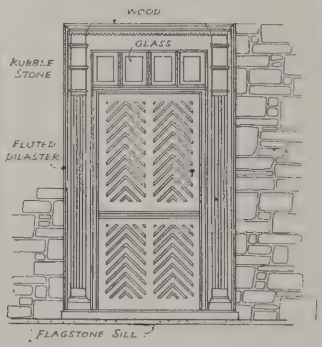
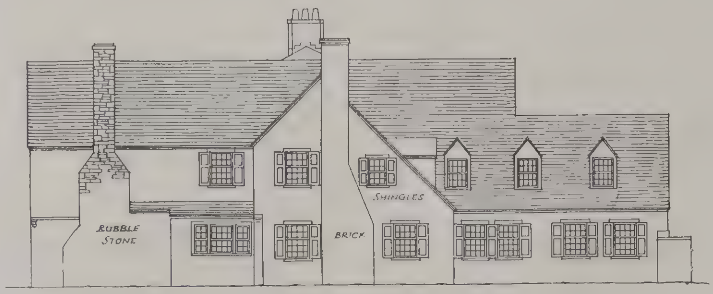


DETAIL of
FRONT ENTRANCE

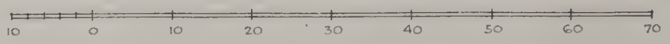


NORTH ELEVATION

DETAILS of
COUNTRY HOUSE
for
WILLIAM Mc CORMICK BLAIR.

DAVID ADLER AND ROBERT WORK ARCHTS

JAN
1929



SCALE IN FEET

No.
3

The ARCHITECTURAL FORUM DETAILS

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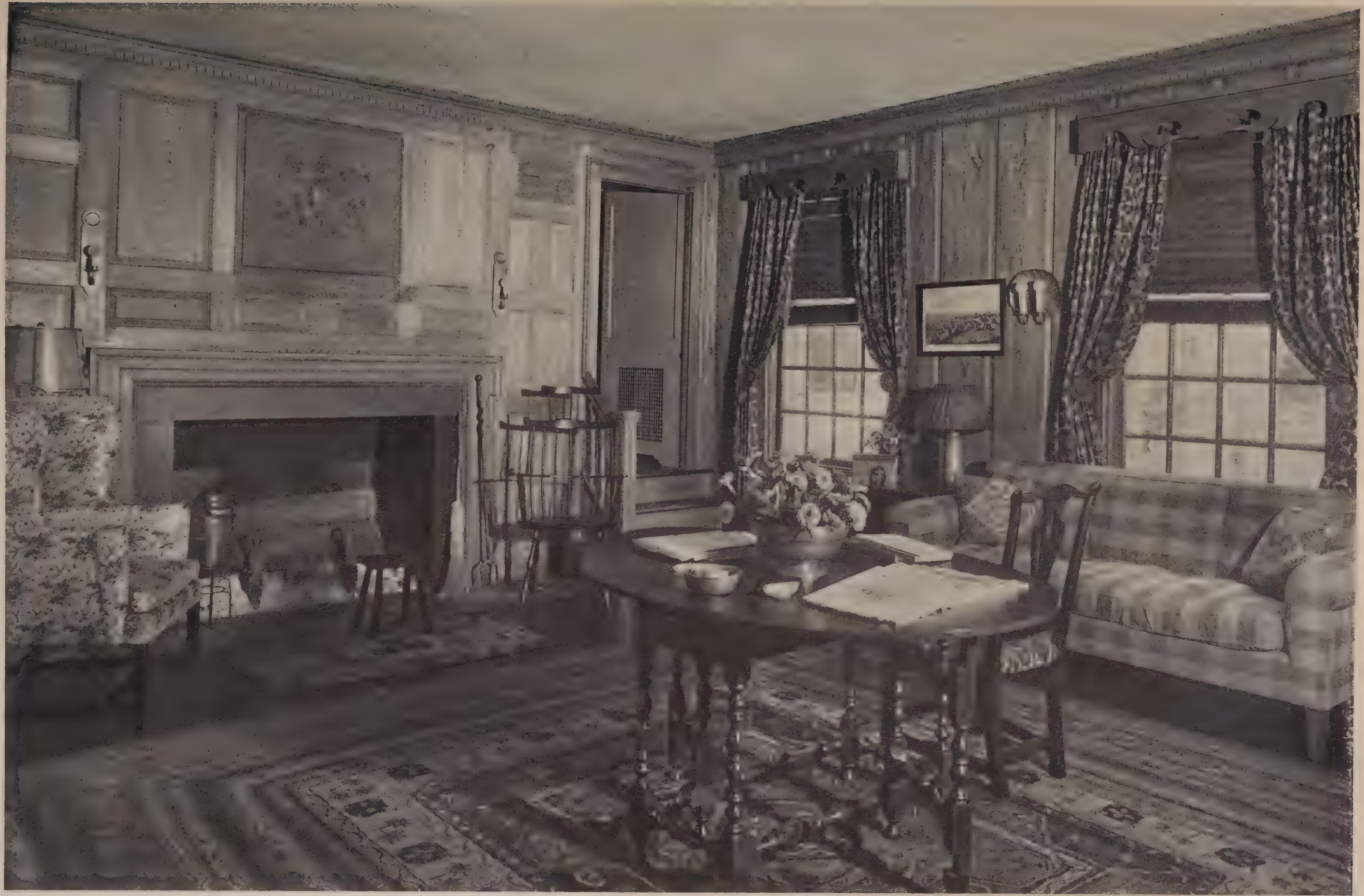
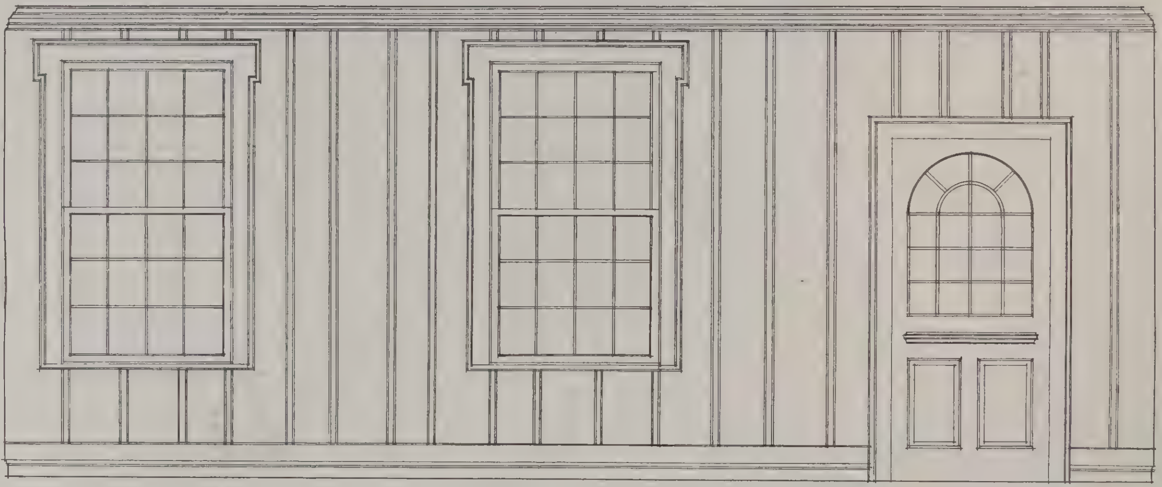


Detail on Back

SITTING ROOM
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS



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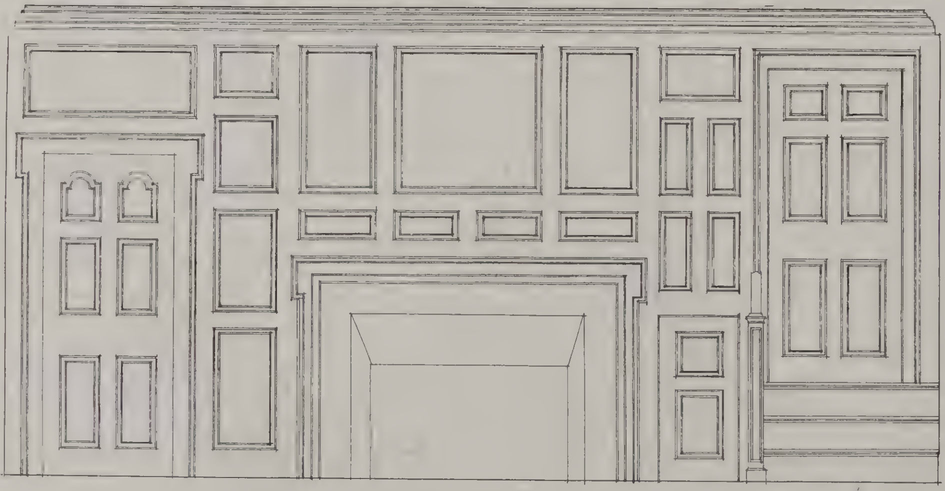

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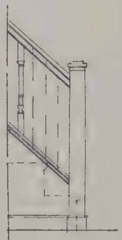

STAIR

SITTING ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

JAN.
1929

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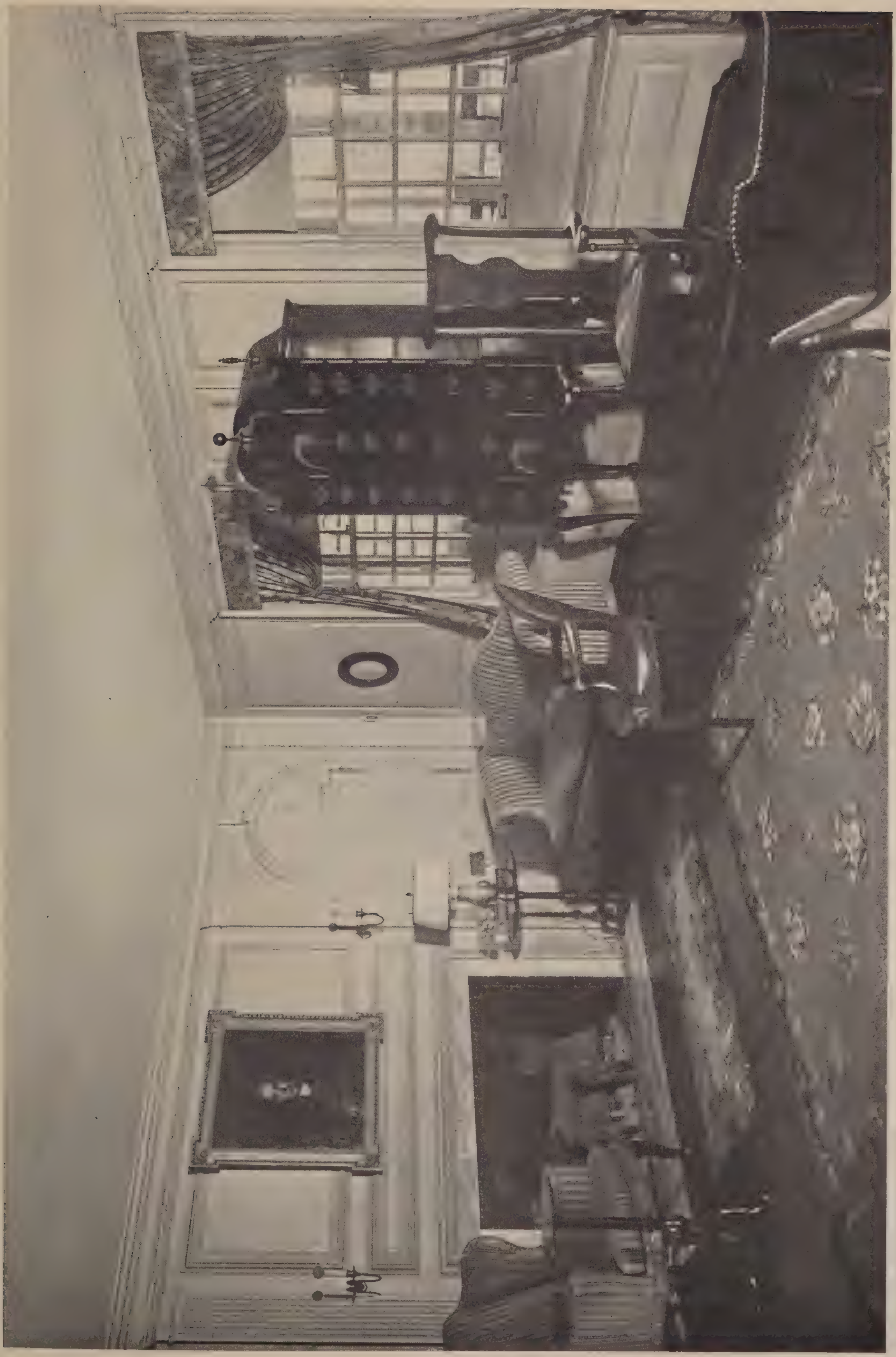
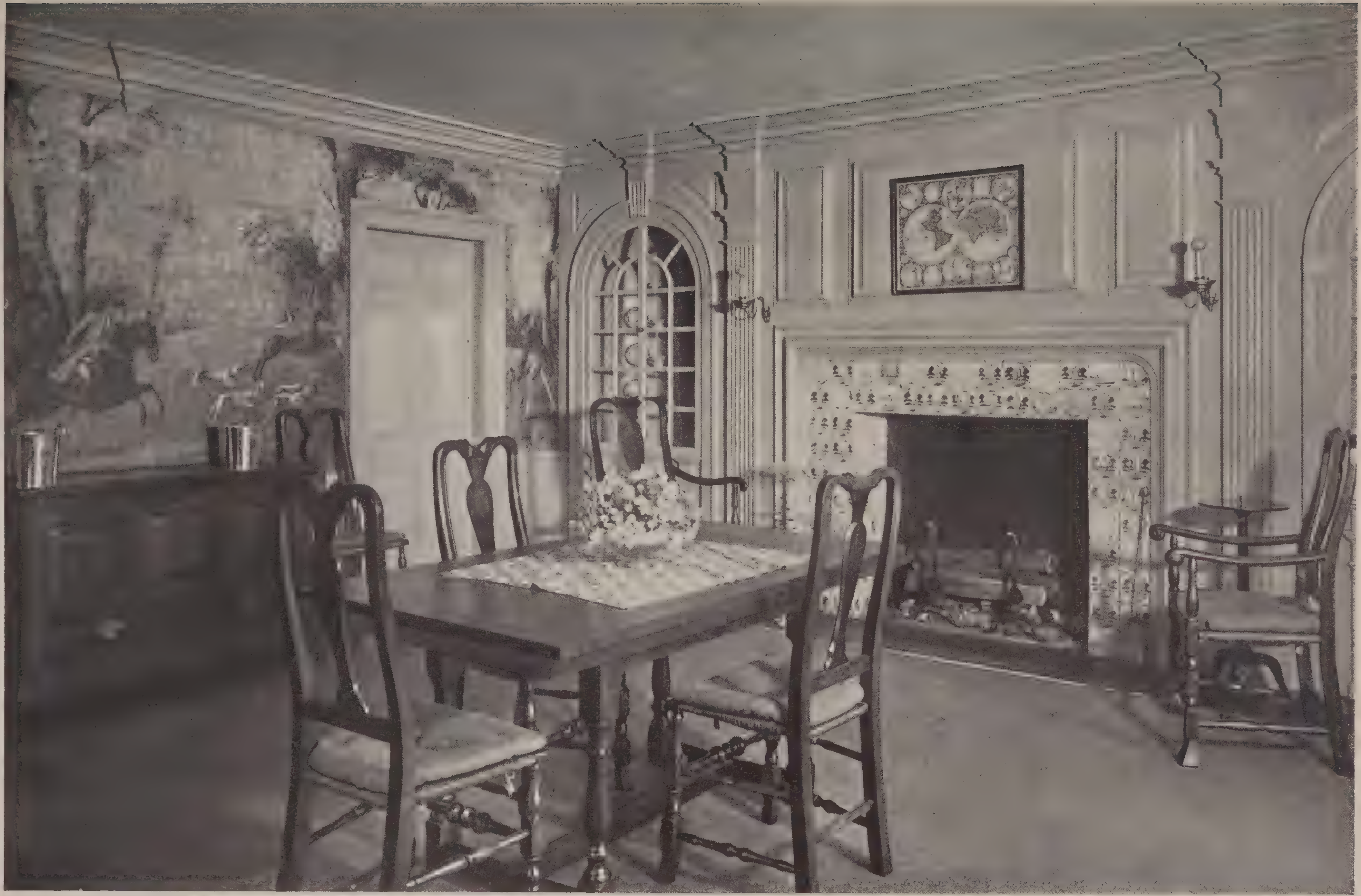


LIVING ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

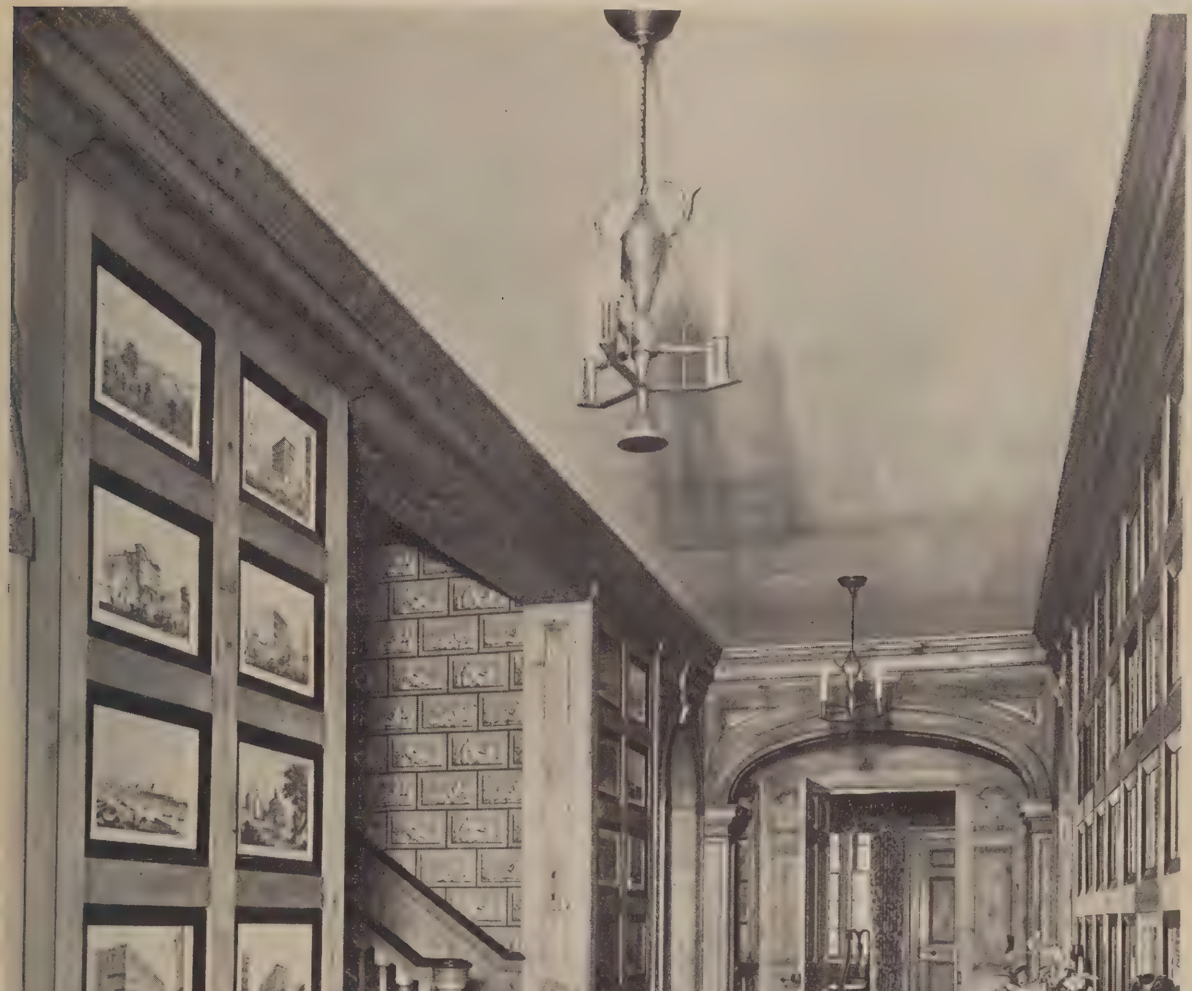
DAVID ADLER AND ROBERT WORK, ARCHITECTS



DINING ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

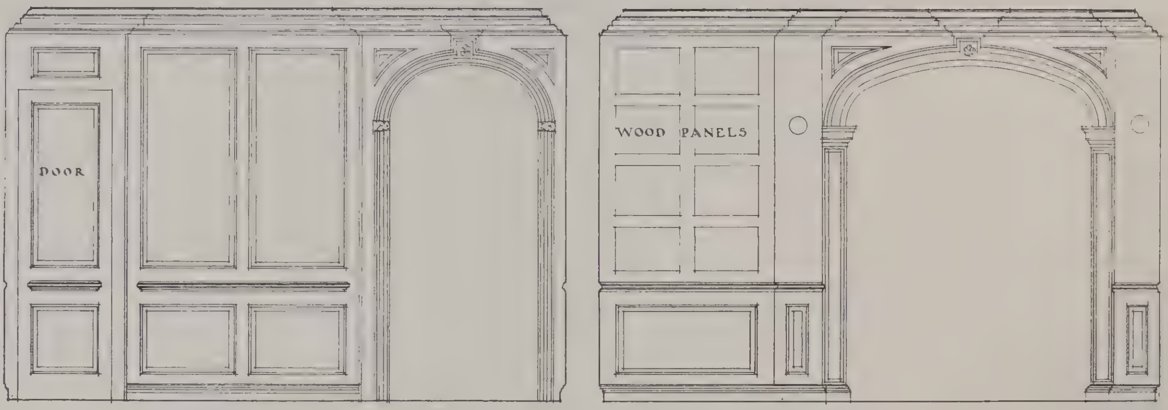


Details on Back

ENTRANCE HALL

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

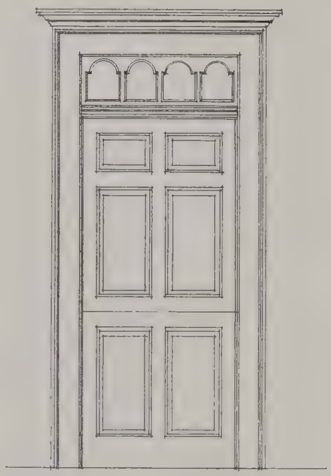
DAVID ADLER AND ROBERT WORK, ARCHITECTS



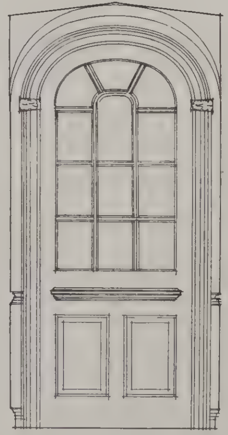
WEST WALL

EAST WALL

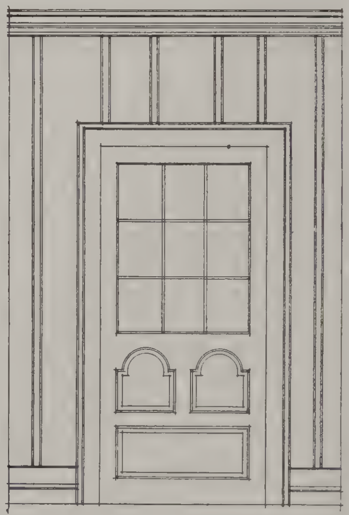
ENTRANCE HALL



AN EXTERIOR DOOR



VESTIBVLE DOOR



SITTING ROOM DOOR

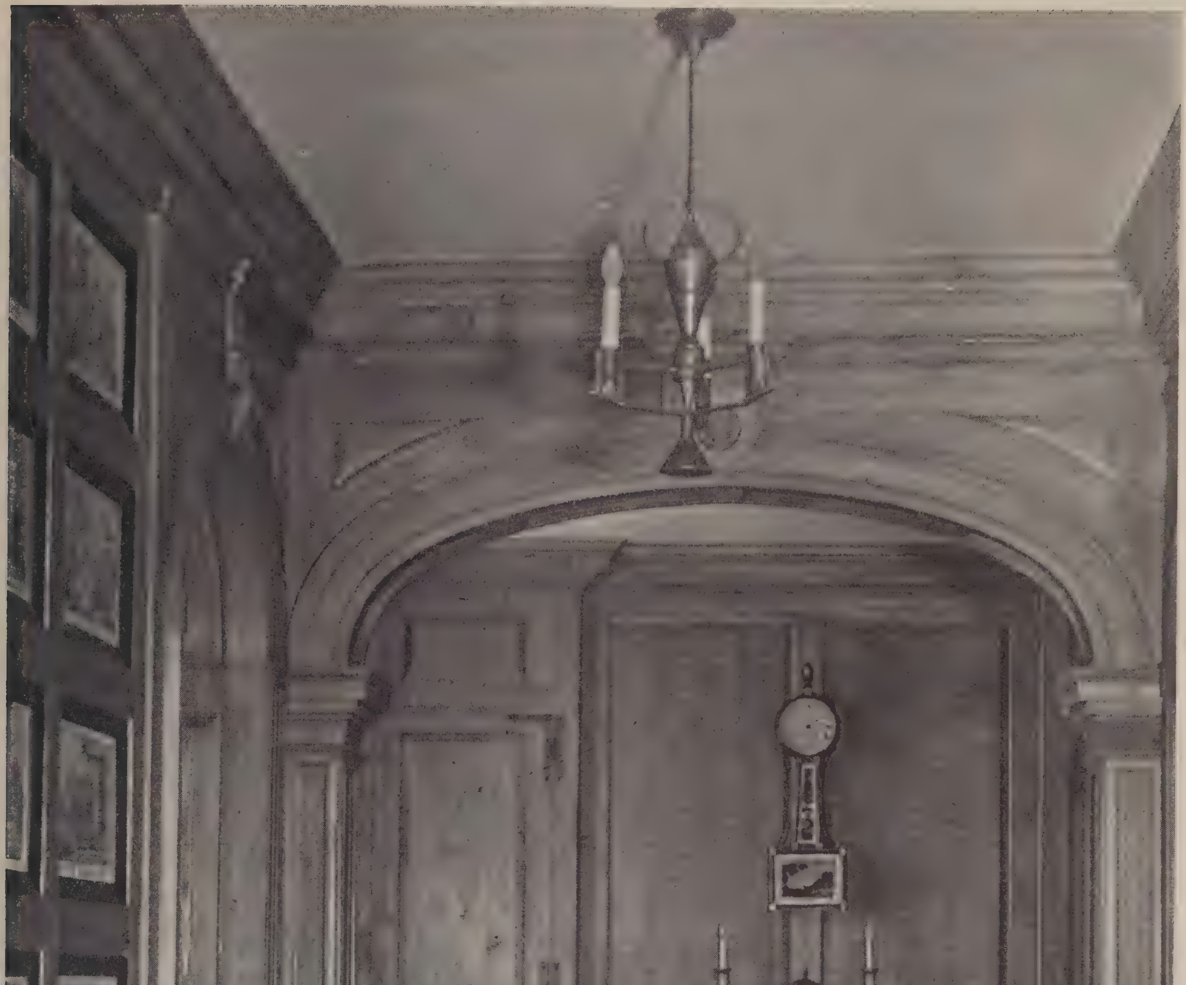
DETAILS, HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

JAN. 1929

No. 5

BOSTON PUBLIC

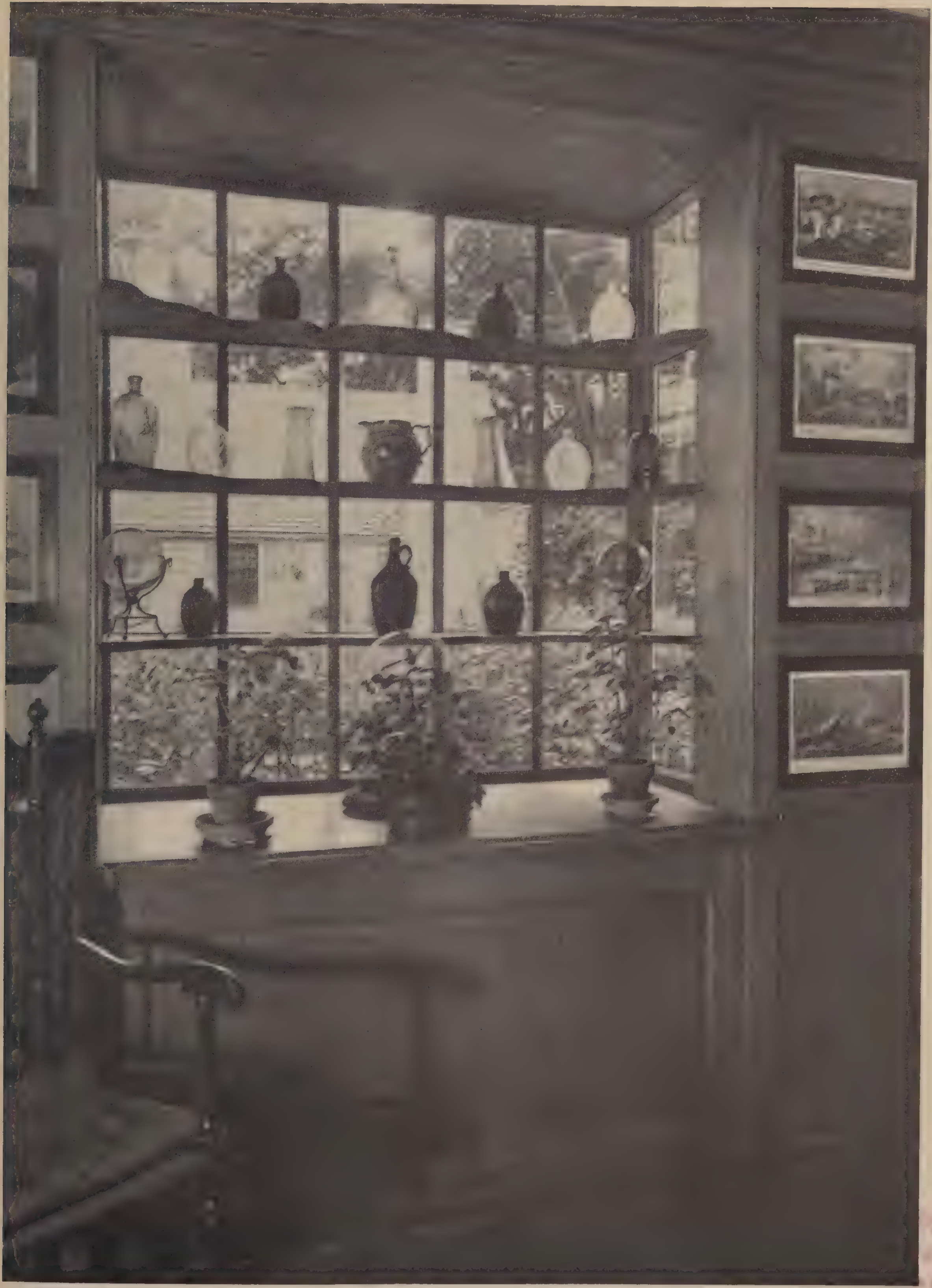
The ARCHITECTURAL FORUM DETAILS



ENTRANCE HALL

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

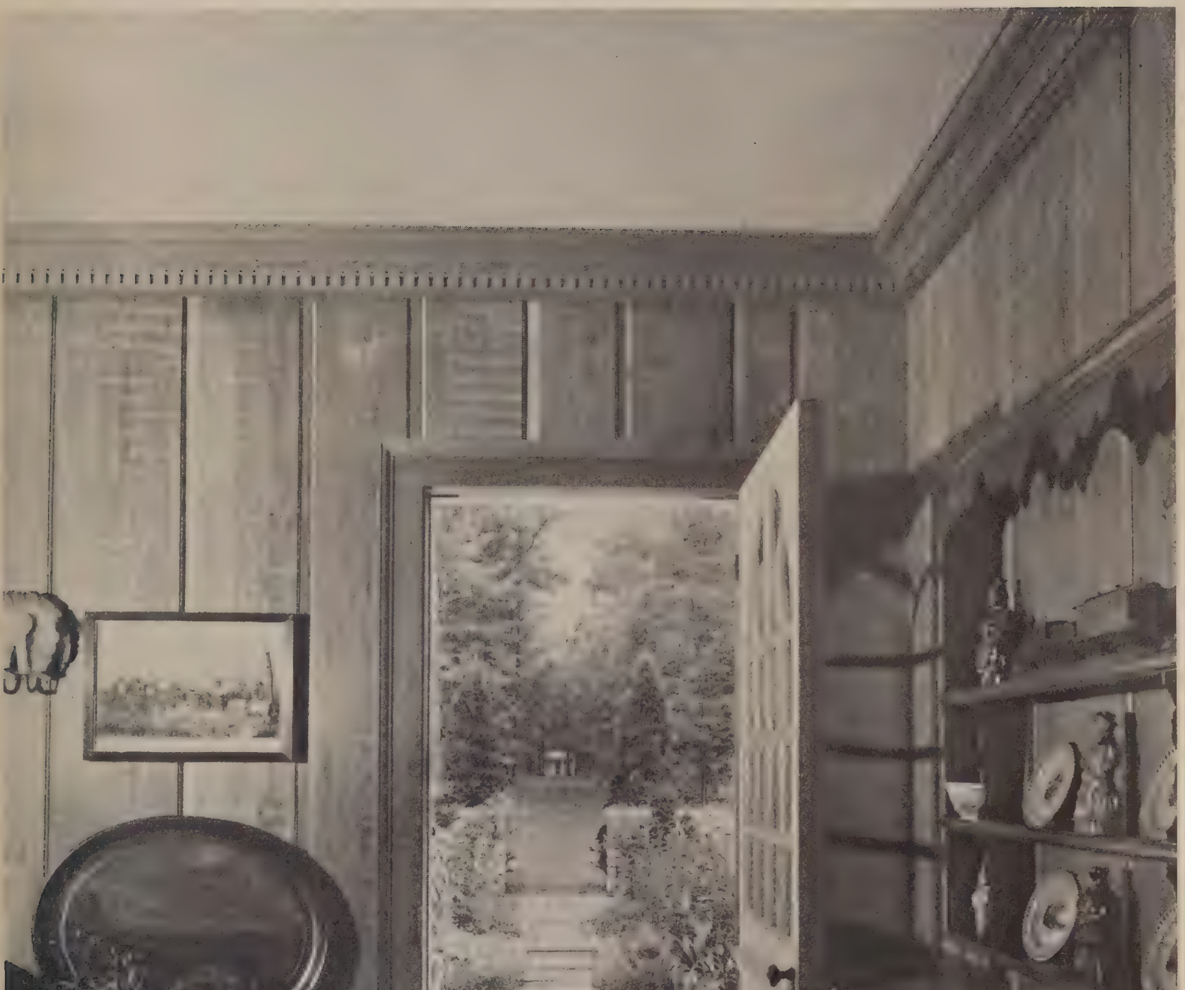
DAVID ADLER AND ROBERT WORK, ARCHITECTS



WINDOW IN ENTRANCE HALL

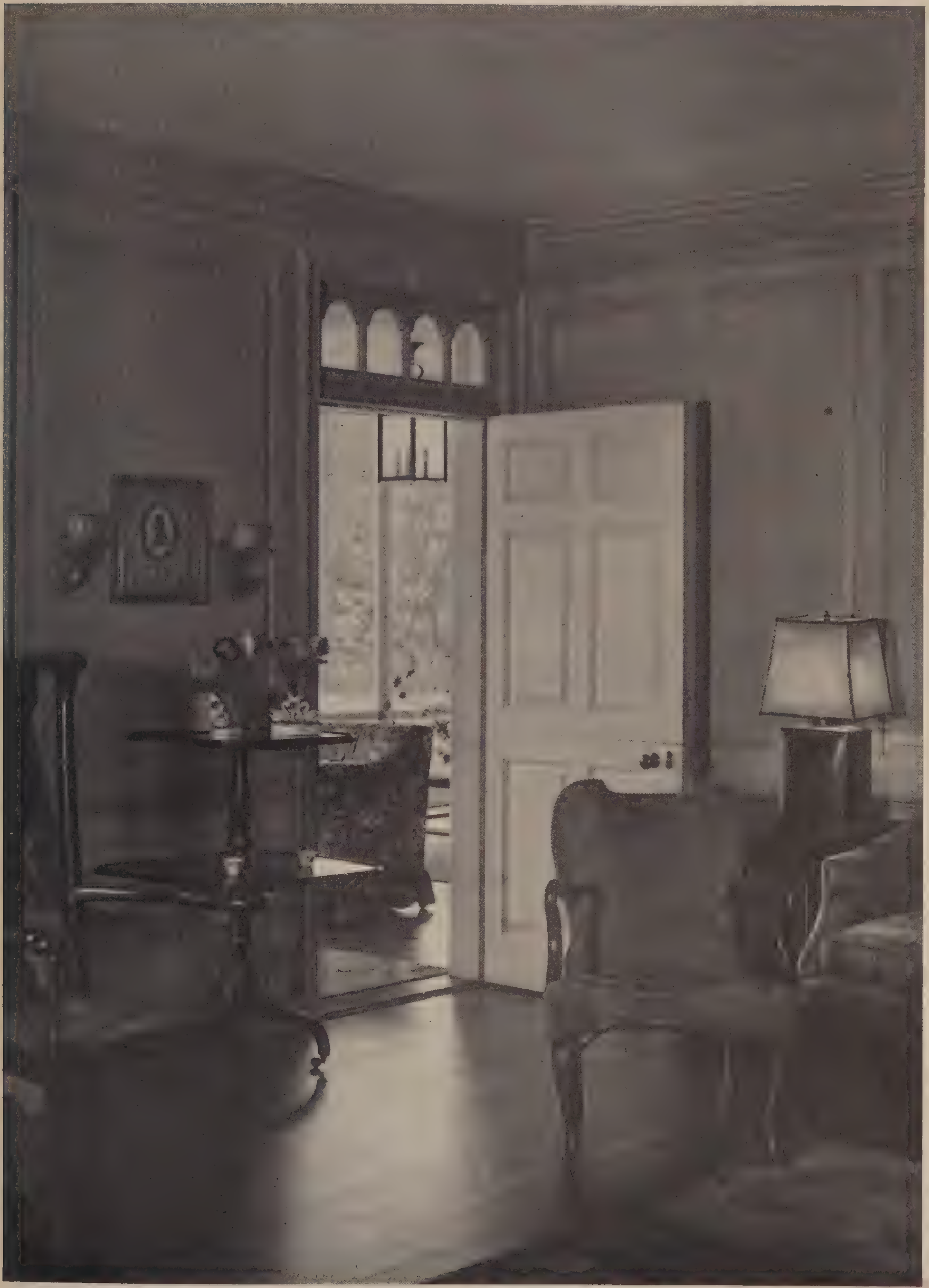
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



CORNER IN SITTING ROOM

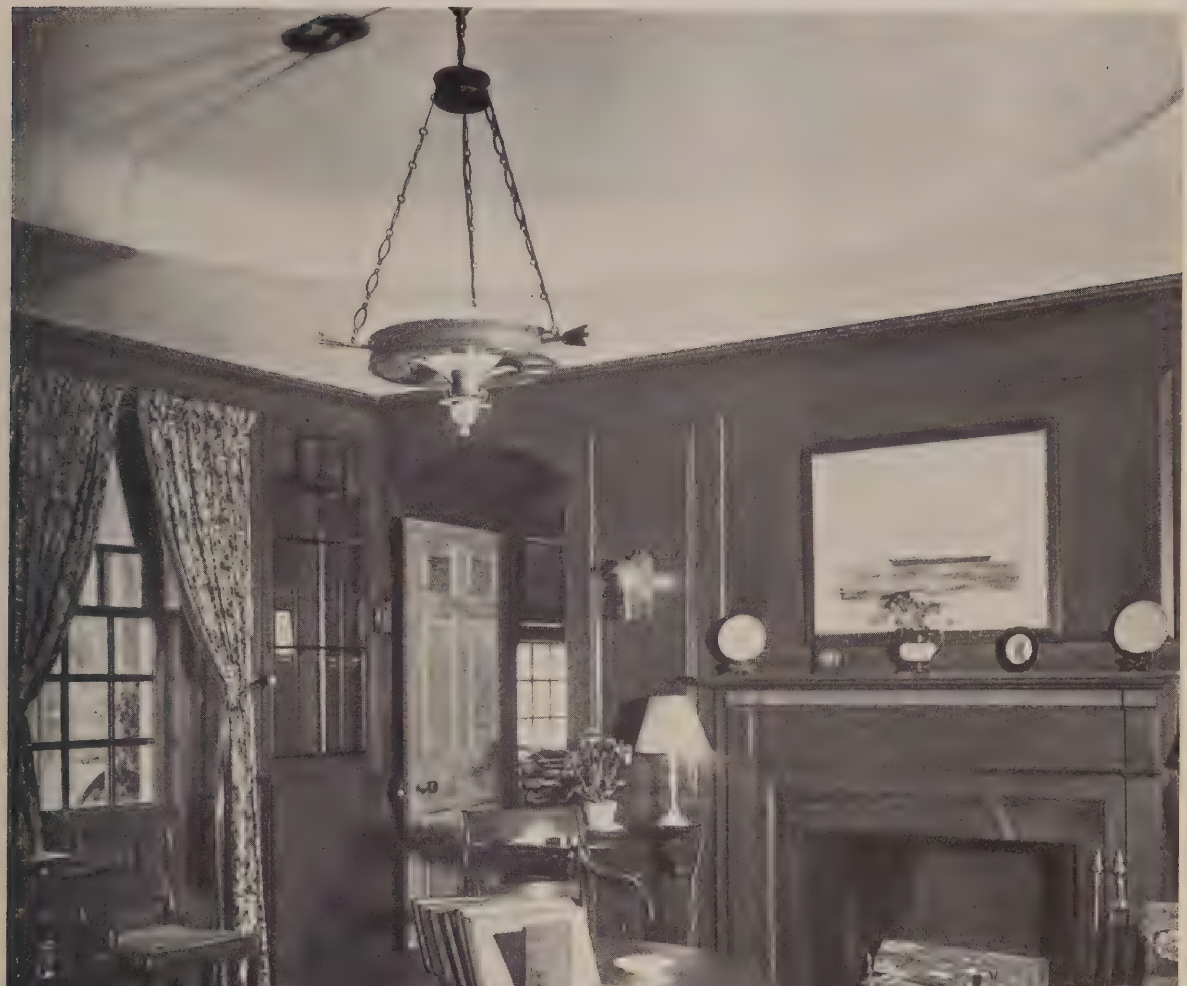
HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS



CORNER IN LIVING ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



Detail on Back

LIBRARY

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.
DAVID ADLER AND ROBERT WORK, ARCHITECTS

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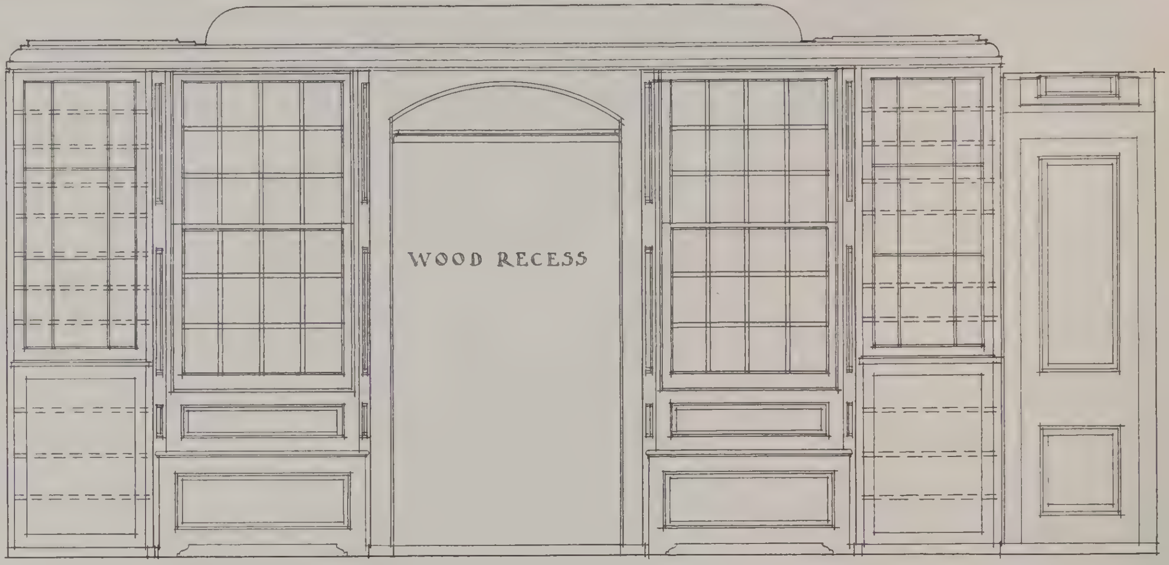

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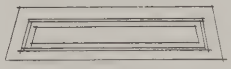

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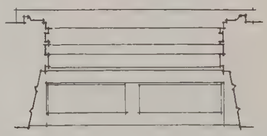
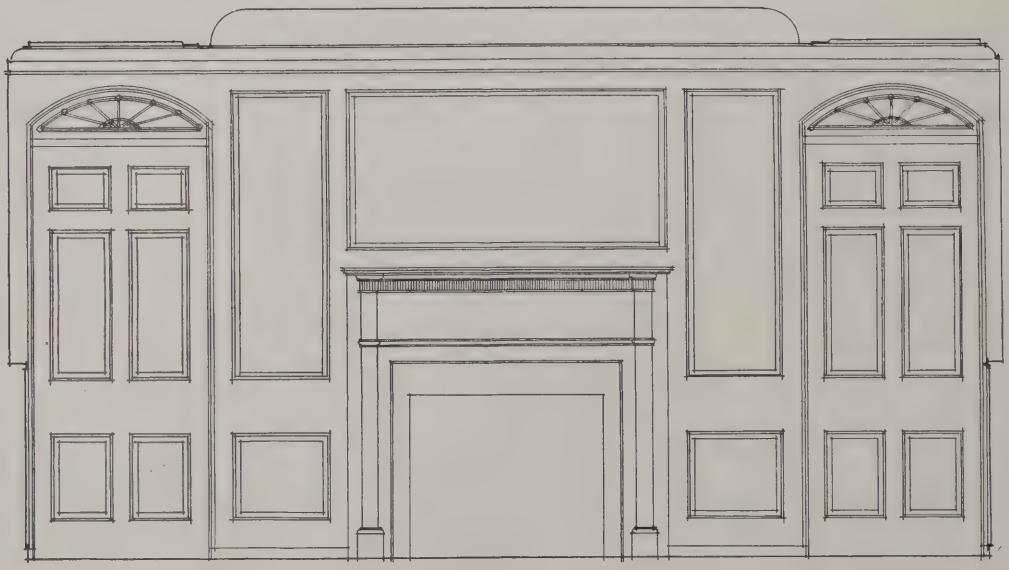


RADIATOR POCKET



SOUTH WALL

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LIBRARY

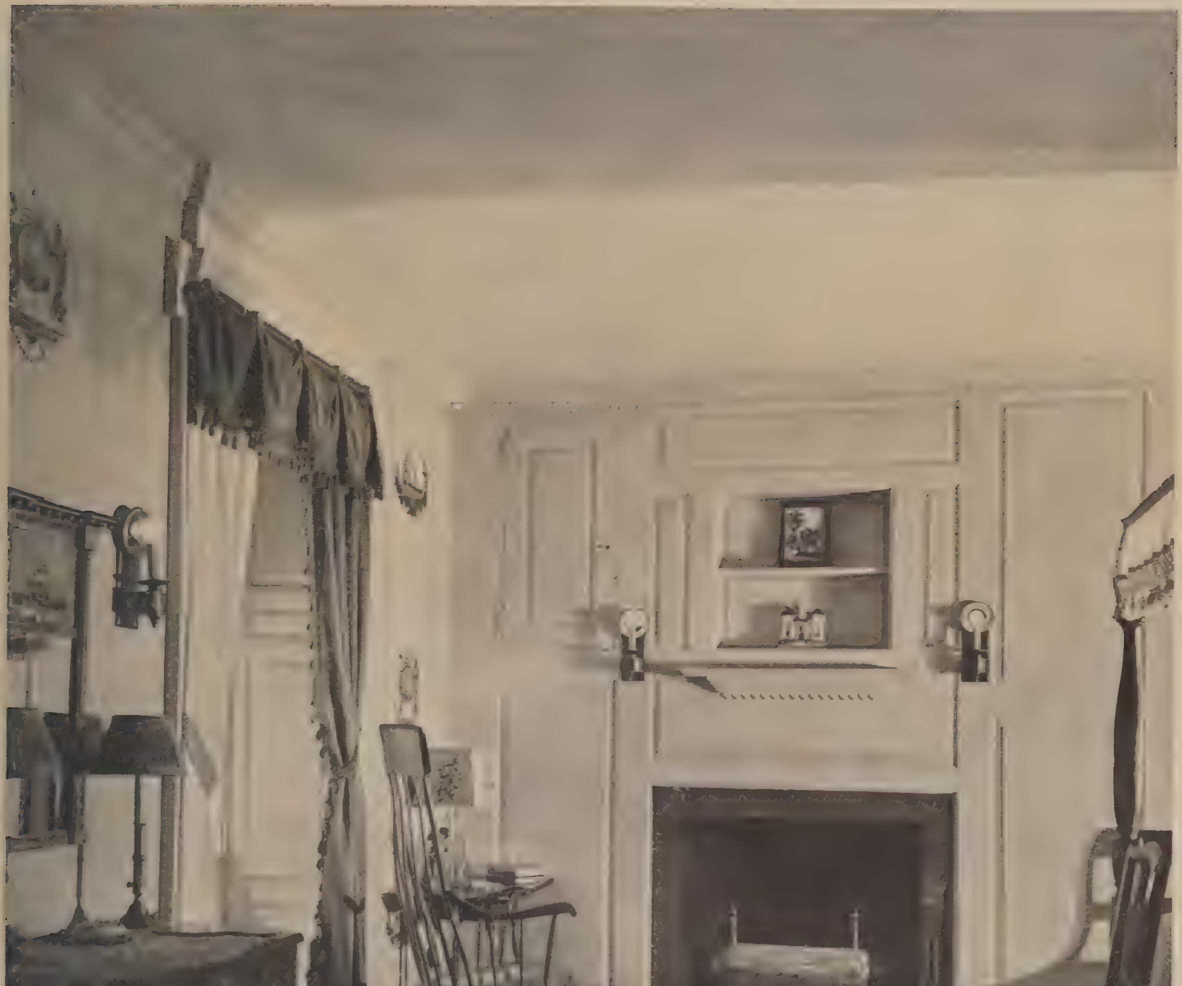
JAN. 1929

No. 6

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

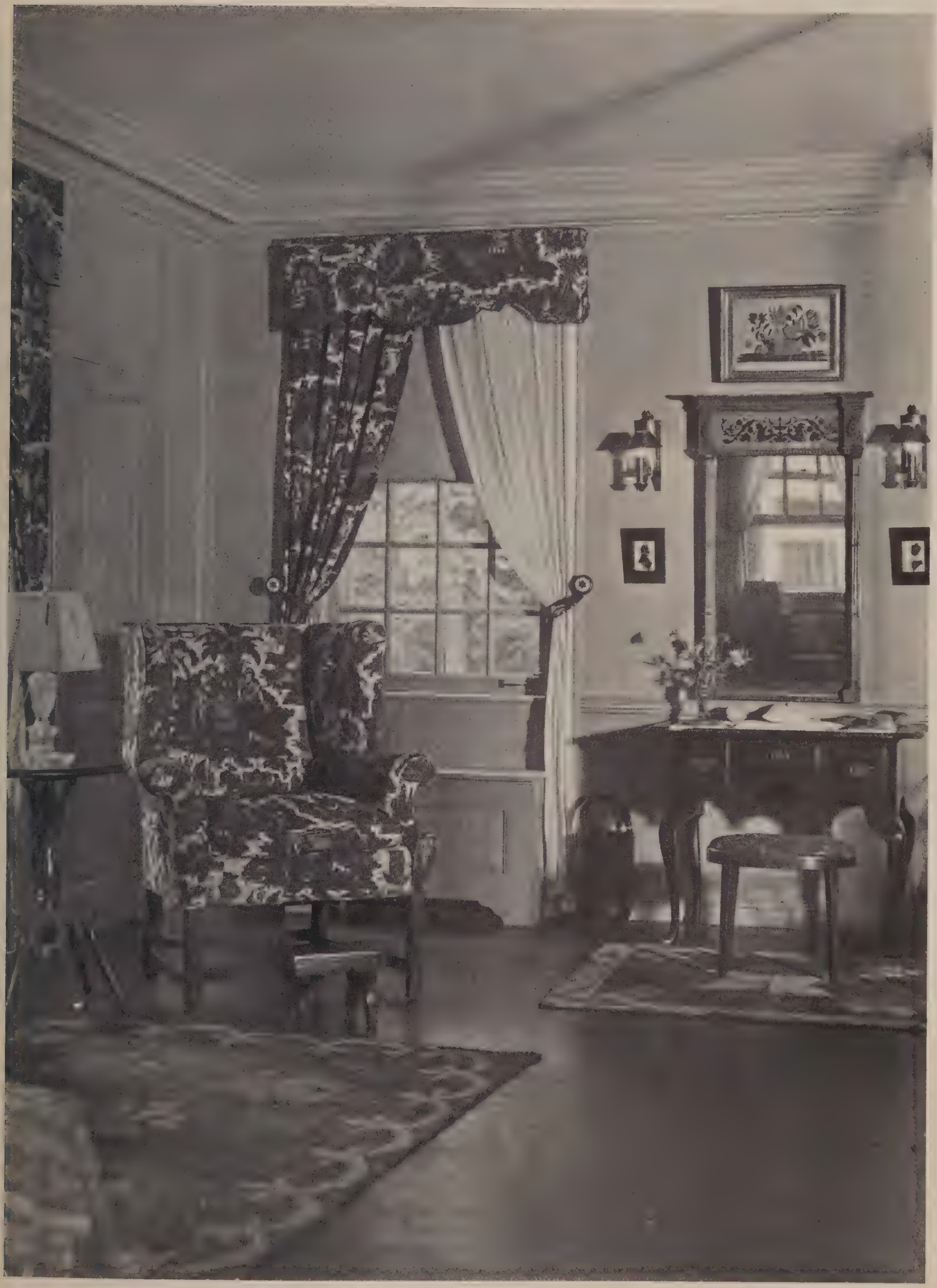
The Architectural Forum Details



GUEST ROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

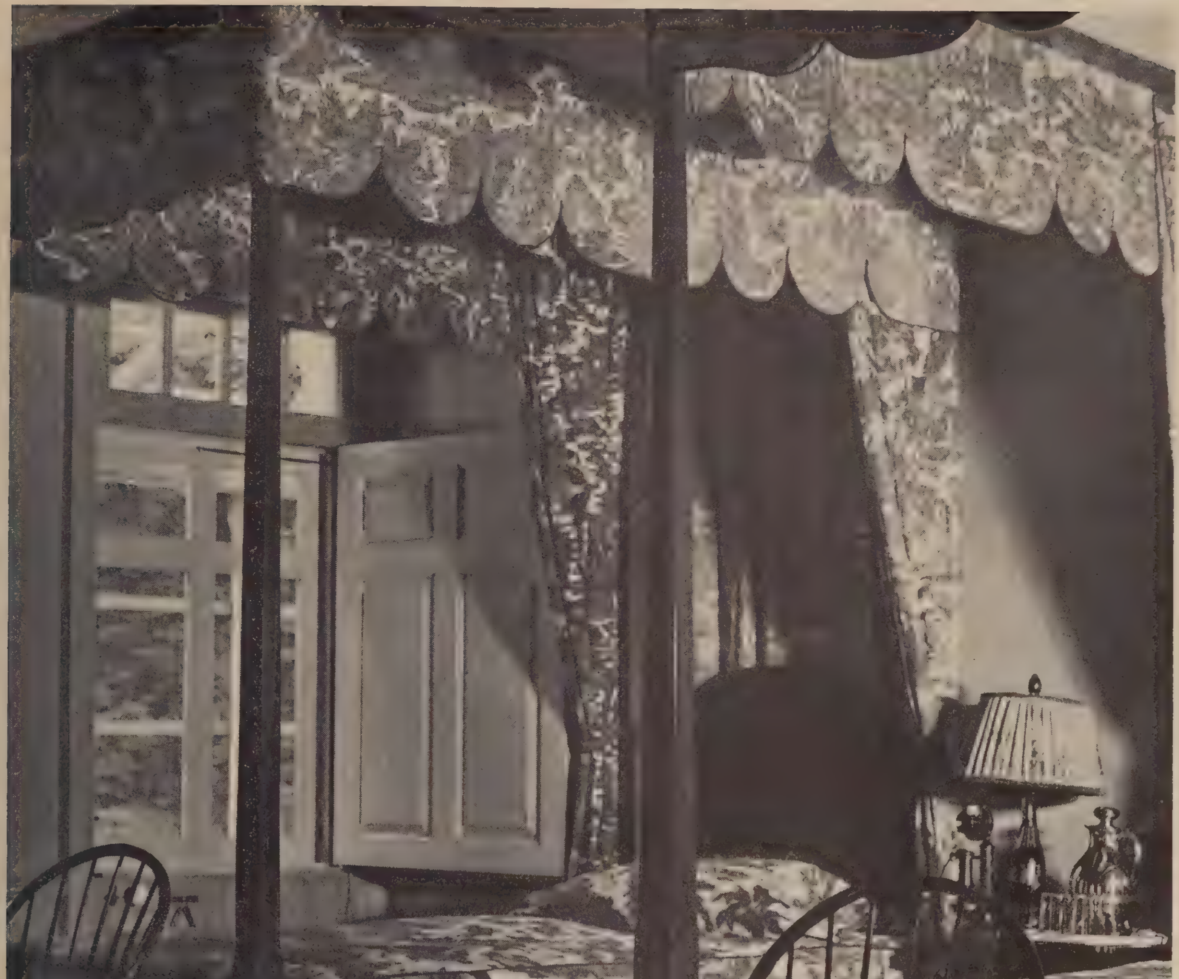
DAVID ADLER AND ROBERT WORK, ARCHITECTS



MASTER BEDROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS



BACHELOR'S BEDROOM

HOUSE OF WILLIAM McCORMICK BLAIR, ESQ., LAKE FOREST, ILL.

DAVID ADLER AND ROBERT WORK, ARCHITECTS

THE REJUVENESCENCE OF WROUGHT IRON

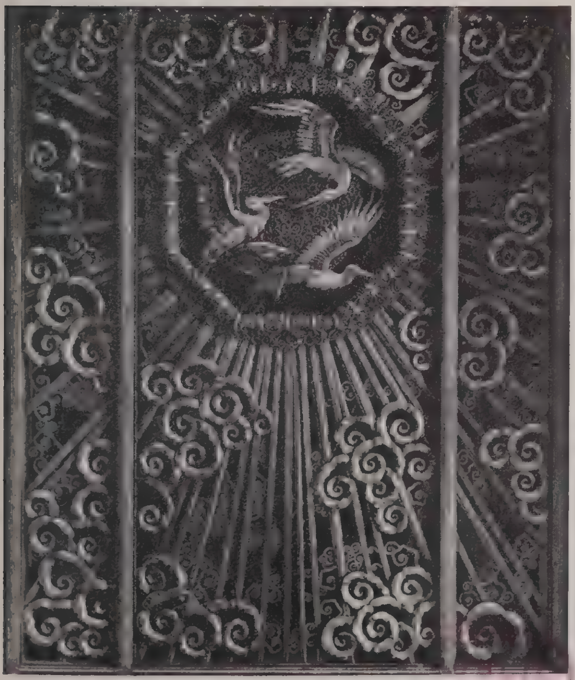
BY

W. FRANCKLYN PARIS

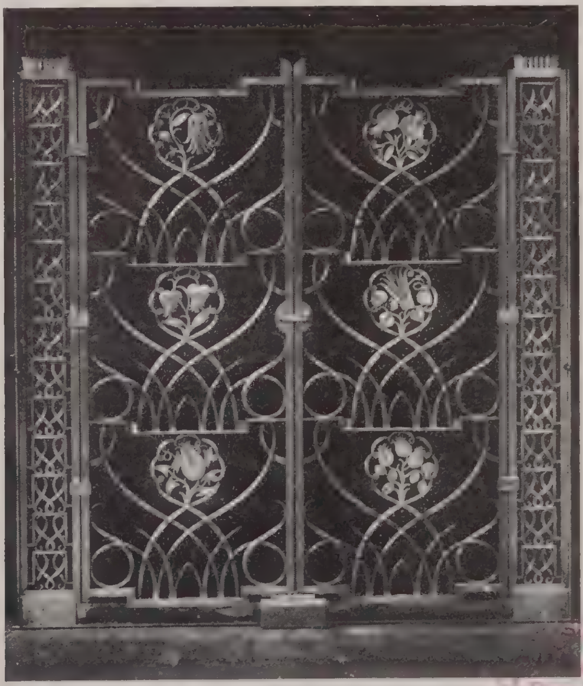
THE many who have raised amused eyebrows over the bizarre effects created by some of the modernists in their excess of innovating zeal, may take heart and be comforted if they will turn their critical gaze upon the artistic wonders now being worked in iron by the French *ferronniers.* Thanks to new facilities in the working of the metal, the use of the lathe and the acetylene torch, iron has become as ductile as clay, and it is now possible to speak of steel "modeling" without taxing the credulity of the uninitiated who do not realize as yet the ductility of the most obdurate metals when brought under subjection in the modern forge by oxygen blowpipes. In the old days the smith had to be "a mighty man." The hammer and the anvil and his own brawn were the instruments which permitted him, in due time, to fashion a church grille or a suit of armor. That he succeeded in bringing out such wonders as the *rejas* of a score of cathedrals,—Burges, Toledo, Granada,—or masterpieces such as the damascened armor of Charles V or Francis I with such primitive tools and at the cost of so much physical effort, is little short of marvelous.

For four centuries, in spite of many improvements in technique, we were unable to surpass or even to equal the work of the armorers of the fifteenth and sixteenth centuries. To view the casques, cuirasses, *chanfreins,* the embossed and fluted armor for man and horse, preserved in the *Armeria Real,* of Madrid, the Museum of Artillery of Paris, or our own Metropolitan Museum, is to be made very humble. That men with their bare hands and such primitive tools as hammer and tongs, pincers and files, saws and vises could have wrought so much beauty out of such recalcitrant materials as iron and steel, leaves the thoughtful breathless with admiration. The same humility will be engendered at sight of the wonderful tracery in iron in the grilles that surround the main altars of the cathedrals of the sixteenth century and which are designated by the Spanish word *rejas.* These *rejas* give evidence of immense labor, extraordinary skill and high artistic sense. In those days, art was long. Without going into the causes of the eclipse suffered in the metallic arts since then, let us rejoice that the darkness is ended and that lasting beauty is again being created in the material once refractory, but now rendered workable by modern science.

From the fourteenth to the seventeenth century, wrought iron played an important role in interior and even exterior decoration. Grilles, balconies, stair rails, lanterns, candelabra, locks, gates, screens, expressed the skill and taste of the metal workers of those days. Even in the eighteenth



Gate, "Les Cigognes," by Edgar Brandt



Gate by Edgar Brandt

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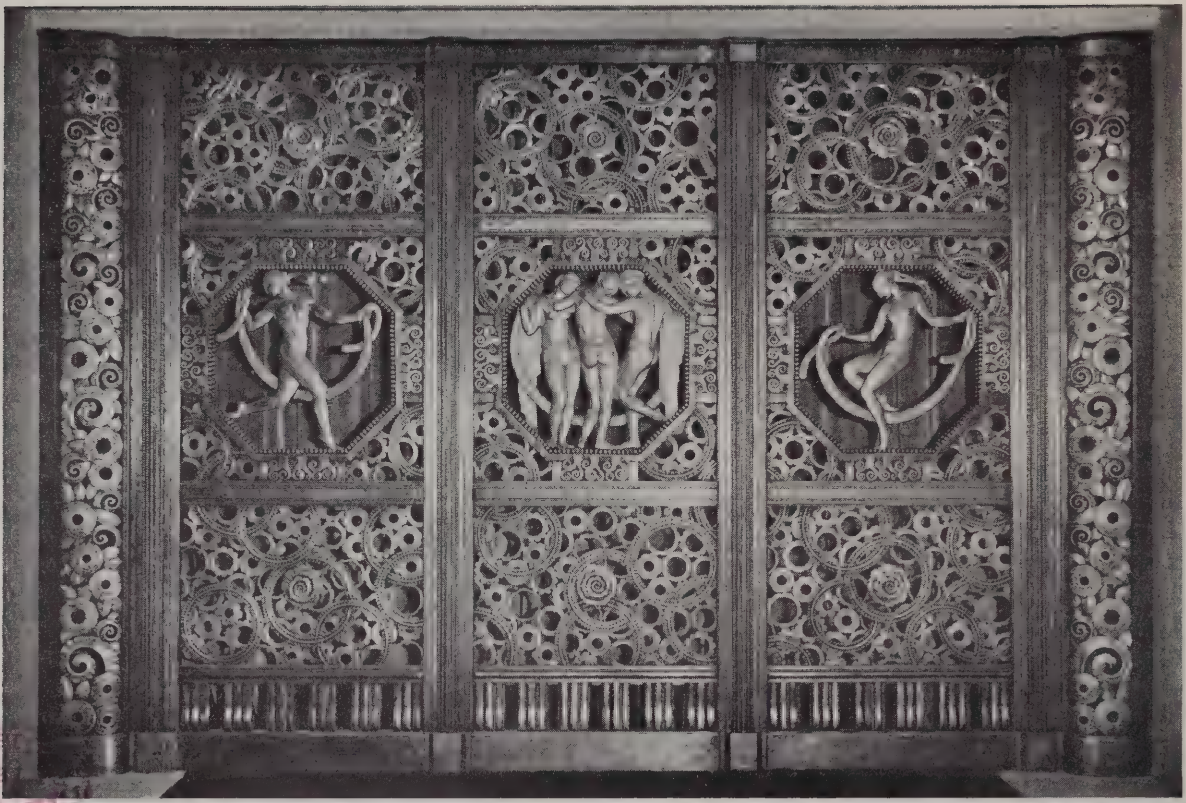
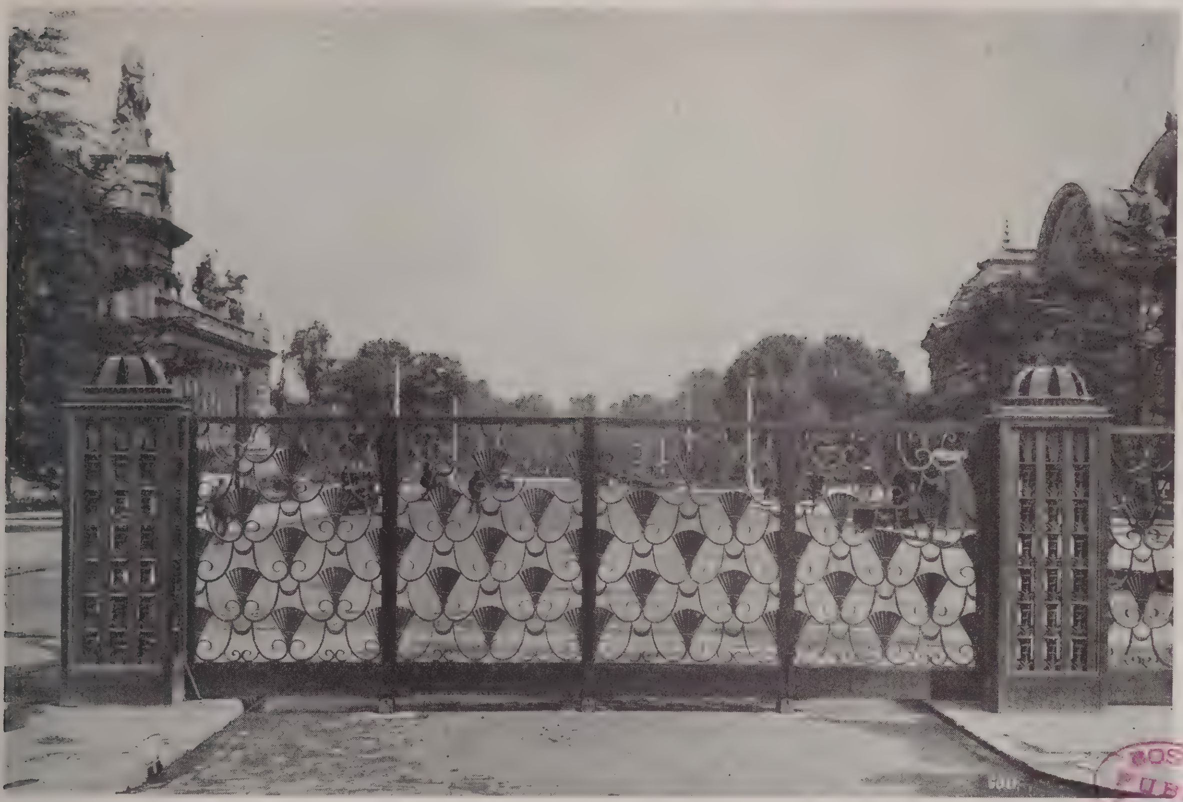


Grille, "Golden Age," Executed by Edgar Brandt from Designs by Favier, Architect, and Blondat, Sculptor

century we have such examples as the gates fashioned by Jean Lamour for the miniature Versailles erected in Nancy by the ex-king of Poland, Stanislas Leczinski, to show that the art was not a lost art, but with the coming of cast iron the *ferronniers* lost their individuality, and original expression ceased, to be replaced by slavish copies of Louis XV or Louis XVI models. The first symptom of a revival dates back to the magnificent rail fashioned for the Chateau of Chantilly by the brothers Moreau, in 1880. Subsequently, isolated amateurs commissioned their architects to introduce wrought iron ornamentation in the designs of their homes, and when the *art nouveau* craze became epidemic, in the decade from 1895 to 1905, the French *ferronniers* once more let loose their imagination and all sorts of botanical effects were created with tortured iron. Standing apart from these innovators, all occupied with the stylization of vegetal growth, was a clear-seeing artist who refused to follow the exaggerations of the hour and who designed and wrought sober works adapted to their intended use and yet inspired with the prevailing taste for floral forms. The eccentricities of the *art nouveau* period have died the death which they deserved, but the metal works of Emile Robert still live.

The present golden era in the art of metal working in France can be traced to the influence exerted even then by Emile Robert. The men who are now turning out the simplified and harmonious pieces so deservedly admired are pupils of Robert or are artists who have followed the trail blazed by him. It was Robert who first showed that wrought iron decoration was possible without constant recourse to use of the acanthus leaf, and while he came too early to be identified with the present *art moderne* formula, his work has in it the elements of logic and clarity and modernism that characterize the decorative art of the moment. We are living in a machine age, an age of metal, the steel age, the age of iron, the age of speed. The aeroplane, the radio are expressions of a state of mind, or rather they have created a mental attitude that is different from the mental attitude of the dainty marquises of the time of Louis XV. Then was leisure; the *tempo* of life was that of the minuet. Today it is that of jazz! The art of today is more virile than the art of yesterday, and metal is taking the place of upholstery. Under this stimulus, consoles and door imposts are being fashioned of metal instead of wood and painted canvas; lighting fixtures, table supports, all sorts of screens, cornices and borders, mouldings and frames are of polished iron or steel or oxidized metal. Only yesterday these works of art in metal were sought only by the aristocracy, and each piece was unique and individual. The demand was slight and the supply in proportion, but today the *profanum vulgus* has



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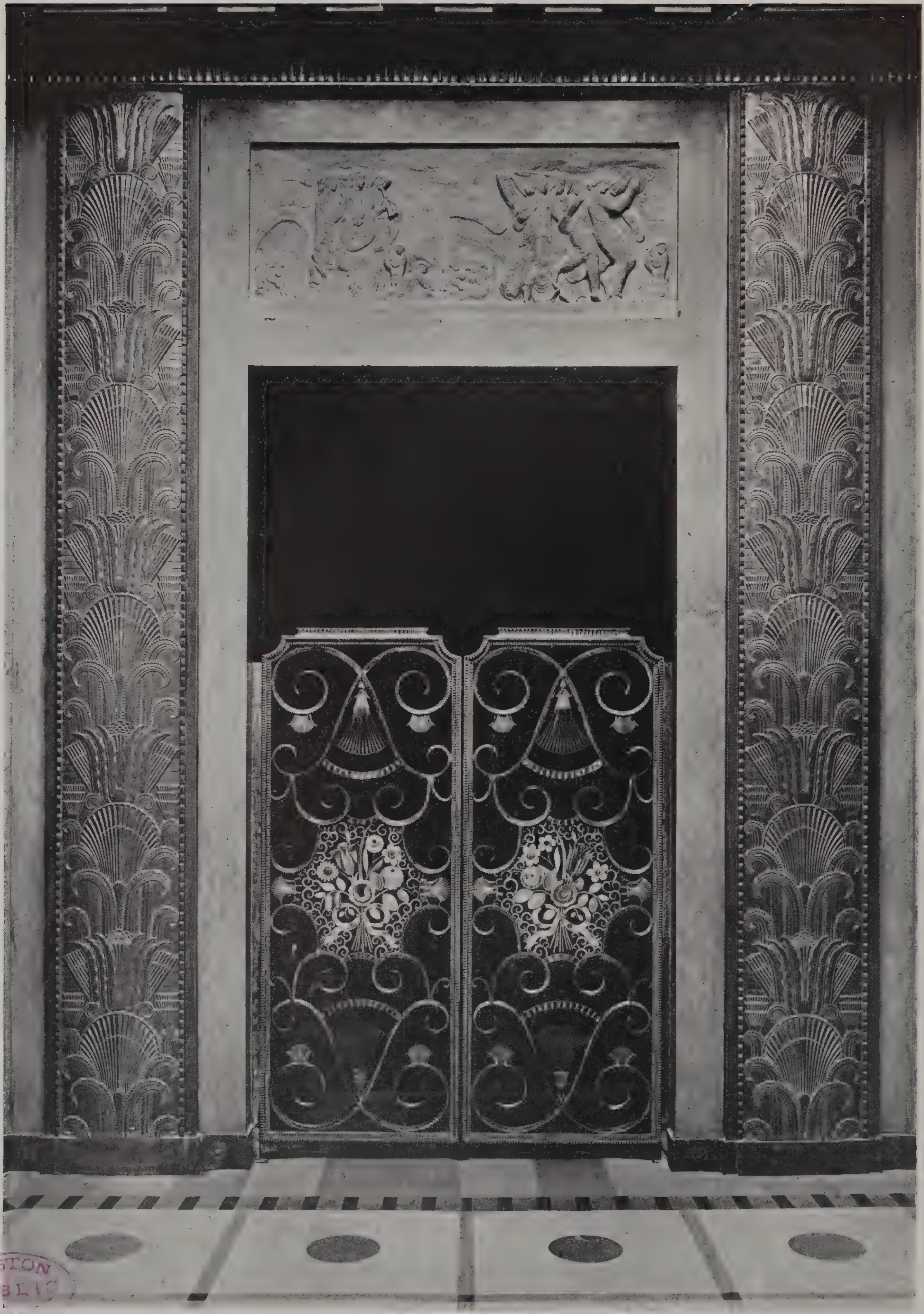
Gate of Honor, Arts Decoratifs Exposition, Paris, by Edgar Brandt

had its taste raised by the wide diffusion of photographic reproductions of works of art, and to meet the demand, artists in metal have had to become manufacturers. Popular taste has improved.

Only by converting his studio into a factory could Robert have turned out the hundred grilles, balconies, railings, screens, chandeliers that decorate the Cartusian Cemetery in Bordeaux, the Museum of Decorative Arts in Paris, the French Consulate in Brussels, the Lutetia Hotel and a score of private homes and public buildings. His successors in popular favor,—Edgar Brandt, G. Szabo, Raymond Subes,—conduct large metallurgic plants to execute their designs, and thus the output is rapid and voluminous. The work of these *ferronniers* really dates back only a few years, since all their efforts were necessarily interrupted by the four paralyzing years of the war. With Ruhlmann, Dufrêne, Sue and Mare and Paul Follot, they represent the rational element of the *art moderne* school. The axiom that an object must be perfectly adapted to its function dictates their designs. They believe that a thing is beautiful when it fulfills exactly the purpose for which it was created. Form is everything; its ornament comes after, and even then it must not be unnecessarily applied. They have avoided the flagitious geometrical eccentricities of the radicals and they admit the curved line into their designs. They all have in varying degree an intuition of beauty. Good taste is instinctive with the French, just as it was with the ancient Greeks and the Japanese, but under the rallying cry of "Novelty, novelty at all costs," which brought together at the Expositon of Decorative Arts of 1925 every variety of the bizarre, they attempted the impossible and tried to create forms and ornamentation completely divorced from what had gone before. Brandt, Szabo, Subes, the brothers Nics, Paul Kiss, Schenck,—all show inventive genius and originality. They are modernists and scorn to copy the old *cliches,* but their composition is sane and plausible and not the product of a geometrical delirium, which the work of some seems to be.

There is to be noted, when we analyze the creations of a *ferronnier,* that in addition to his artistic ability he must possess technical and scientific knowledge not needed by the artist who is merely a draftsman. It is not enough to create a design; if it is to find expression in iron, the design must be of a nature that will lend itself to metallic realization. A good *ferronnier* is in addition a good architect, a good engineer and a good chemist. Sometimes this ideal may not be attained, in which case the *ferronnier* must enlist the coöperation of an architect. We find Brandt, for instance, collaborating with the architect Favier and the sculptor Blondat in a magnificent grille in which are set modeled figures in gilded metal.

Iron having become as malleable as putty, and



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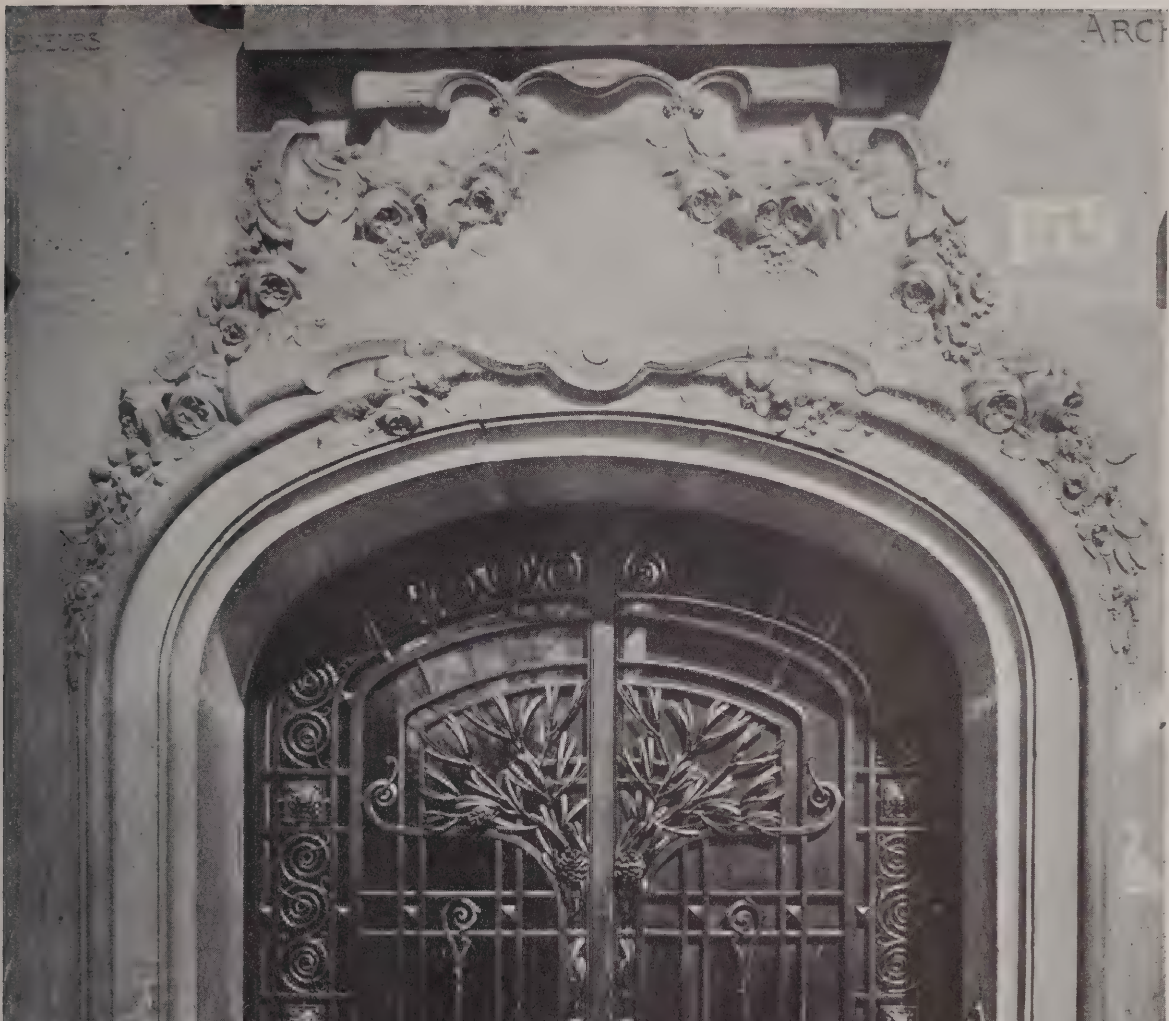
WROUGHT IRON GATES BY EDGAR BRANDT
FOR THE ARTS DECORATIFS EXPOSITION, PARIS



ENTRANCE DOORS TO A PRIVATE RESIDENCE, PARIS
DESIGNED AND WROUGHT BY EDGAR BRANDT

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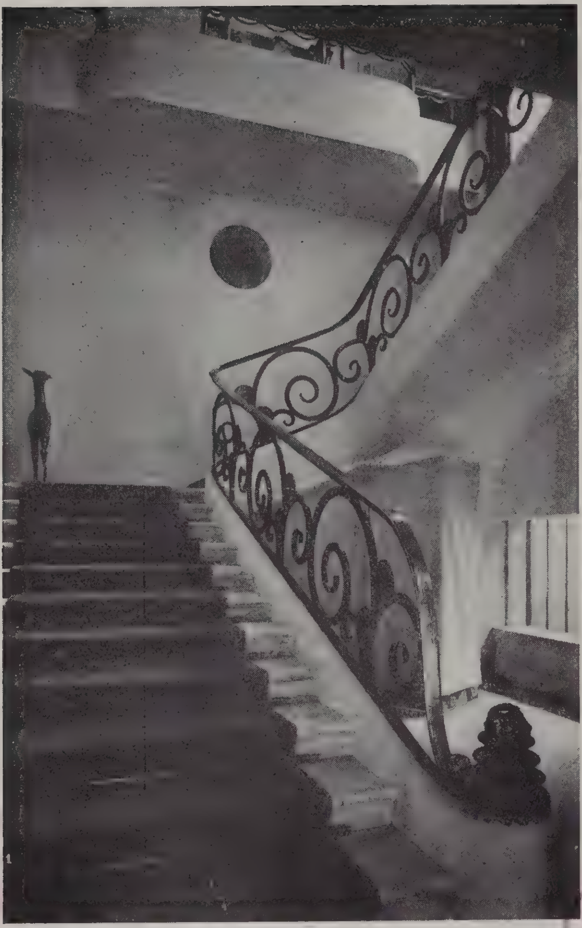
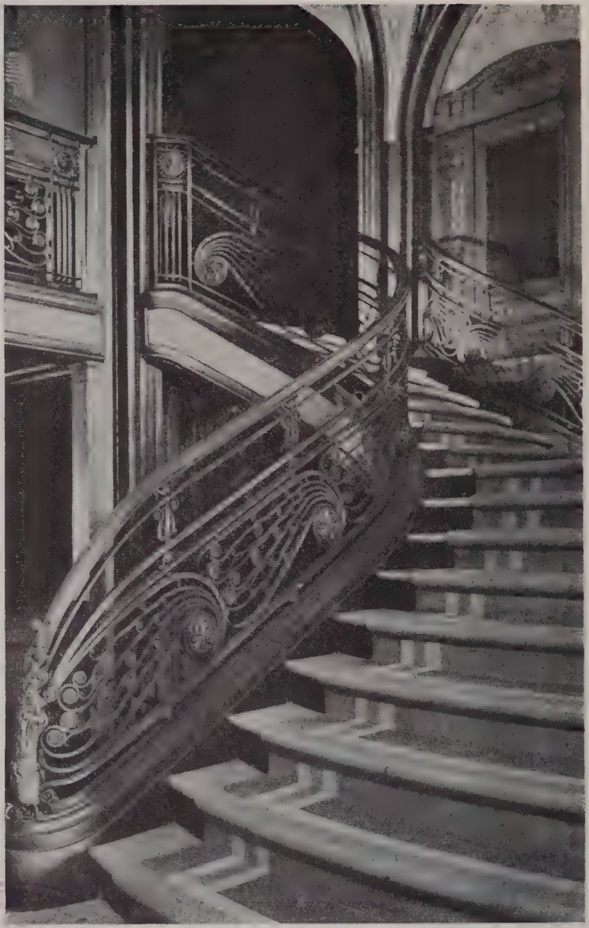


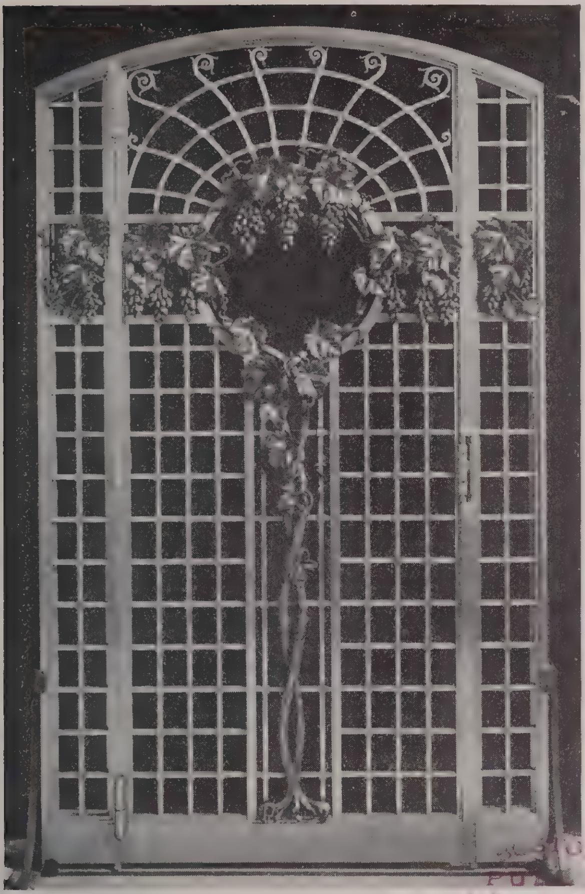
Stair Rail in the Residence of Paul Poiret, Paris
Designed and Wrought by Edgar Brandt



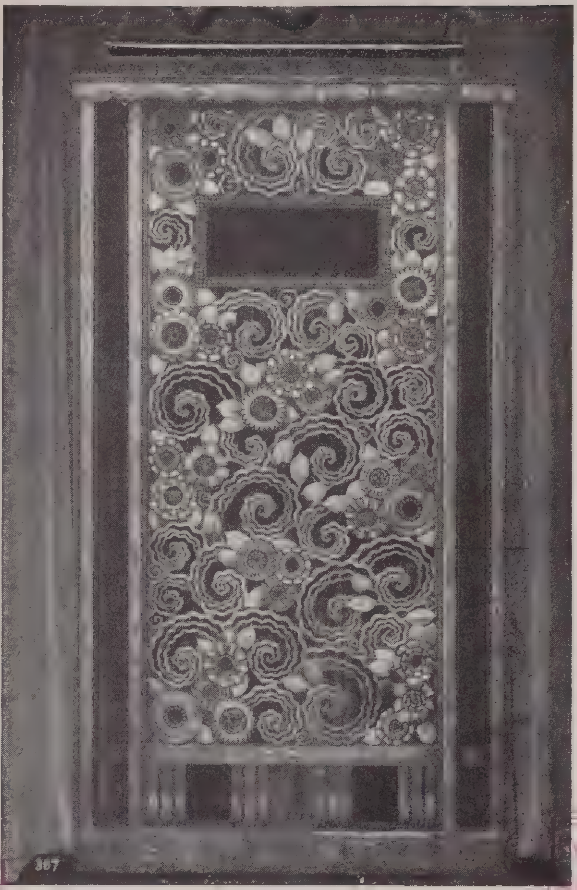
Stair Rail, S. S. Paris, French Line
R. Bourvens de Boijen, Architect

the new technique, aided by electrical machine-tools and the acetylene torch having facilitated the thinning and welding of the metal, we find ourselves beholding fine traceries impossible of execution under the conditions existing a generation ago. Similarly we find the *ferronniers* widening their field in the designing of their pieces, so that instead of inspiring themselves with the works of the earlier workers in metal and copying or executing variations on their themes, they now inspire themselves from textile designs found in old silks from China and Japan, wall decorations found in Egyptian tombs, or motifs borrowed from Aztec or East Indian sculpture. The field opened up by the new technique is so vast that it can be said to be limitless. Difficulties no longer exist, and we may even find in the near future some master in the new art reproducing in iron some cobweb design executed in Malines lace. Brandt utilizes the plant life in many of his designs, but he seeks exotic examples, such as the *ginko-biloba* which grows in Indo-China, and other tropical vegetation. He also uses to advantage the interlocking of circles and circular flowers and the strange outlines obtained by cross-sectioning the stems of certain plants. When he composes a grille, his first concern is its general architecture, the proportions, the divisions, the relation of height to width, etc. He then fills his vertical panels, but the decoration never extends beyond the frame. There is a surface, and nothing protrudes therefrom. No plant, if plant motifs are used, projects a leaf or thorn or twig beyond the thickness of the framework. All large fruits or flowers are banished, because their rotundity would be out of scale and destroy the unity of the dimension of thickness. During the "naturalist" period, the stunt was to reproduce plant life in its most minute detail, with the result that the *ferronnerie* of the period was dangerous of approach, with all its sharp points and edges.

The rationalism of Brandt, his acknowledgment of the past as a valuable inheritance, his strength and at the same time his lightness and gracefulness of touch, his originality and modernism and at the same time his respect for tradition, make of him the acknowledged master of the rejuvenated art of metal working. His contrasts are obtained by oxides and the use of silver and gold, which emanates from the metallic harmonies composed



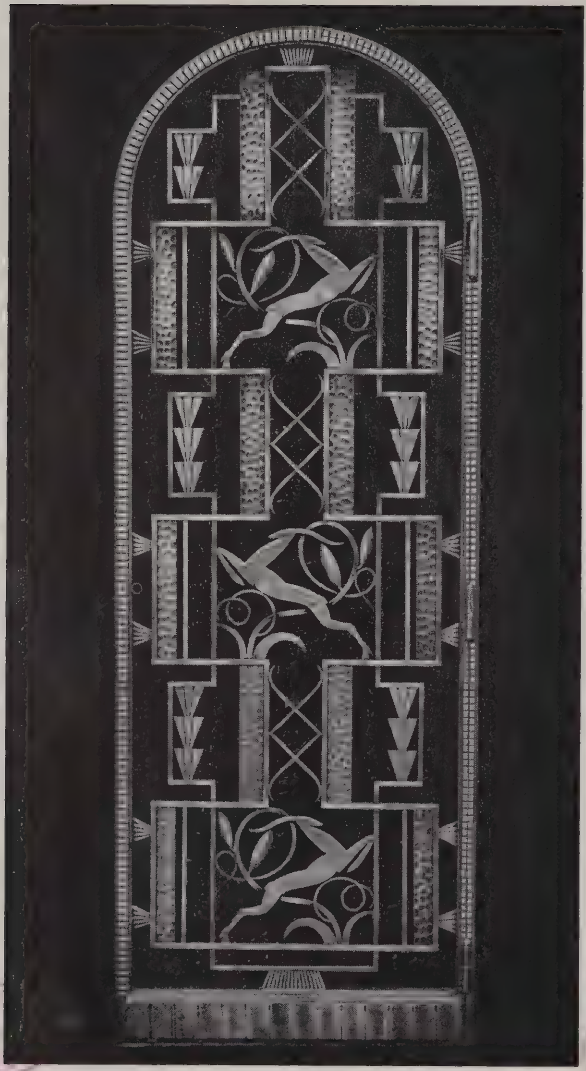
Entrance Door to a Private House by Edgar Brandt



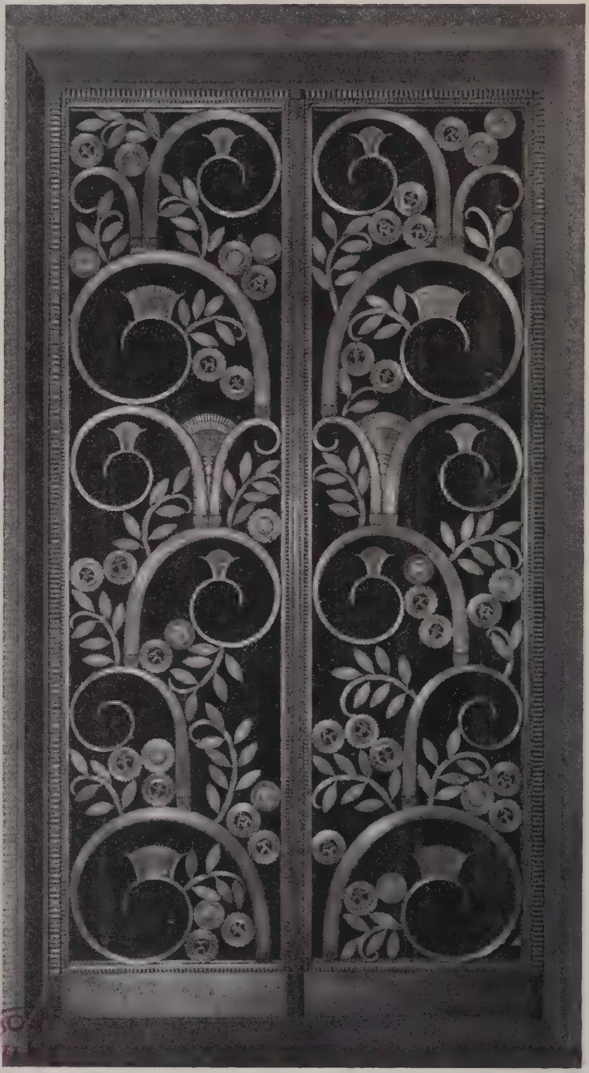
Wrought Iron Screen by Edgar Brandt

by this musician-mechanic. The public has seen his setting for the "eternal flame" at the tomb of the unknown soldier under the *Arc de Triomphe;* the monument in commemoration of the armistice at Rethondes; the gate to the monument at Douaumont; and the grille at the entrance to the Exposition of Decorative Arts, and hundreds of private residences, not only in France but in every capital of the civilized world, hold gems of his making that photography can only feebly portray. The illustrations that accompany this article will give a graphic idea of the fertility of invention, the mastery of the new technique, the harmony of ensemble and detail and the architectural unity of the works of this great artist, but they cannot convey the feeling created by the tone, the color, the patina. Note the delicacy of tracery, without sacrificing solidity, in the grille for the Exposition of Decoratve Arts. A simple assemblage of alveolar, fan-shaped segments, is united in a sort of damask pattern by fine arabesque curves. Observe the sinuosity, the movement, in the stair rail for the liner "Paris." A more fanciful note is struck in the door where the panels are balanced by a conventional antelope against a background of vegetal spirals (page 96).

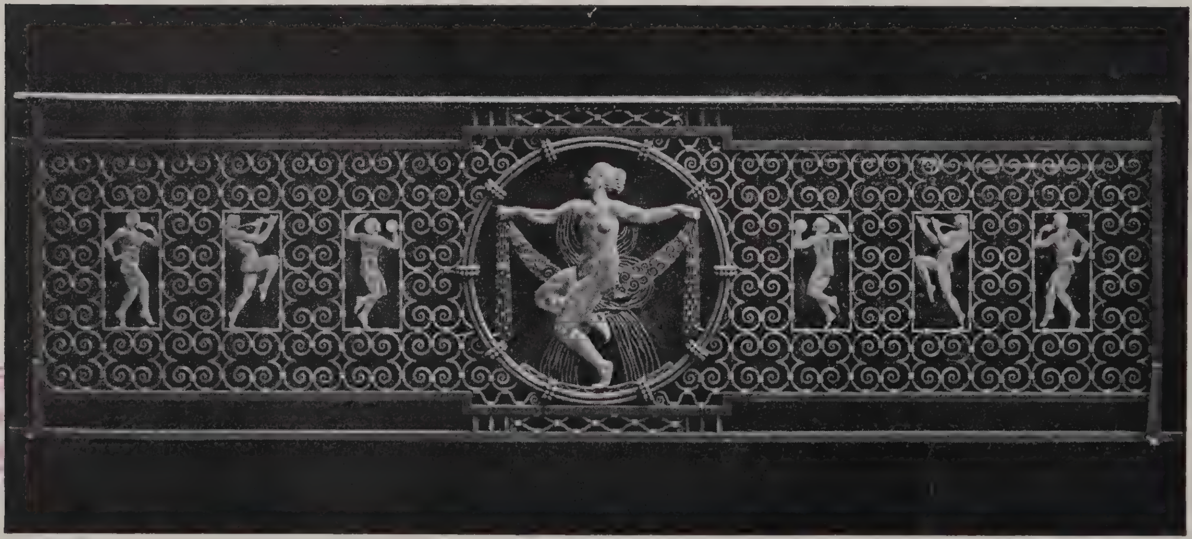
A realization of the gain to art resulting from the new technique of welding will be derived from the study of this delicate interior gate in which the ligations are all obtained by welding and in which solidity is obtained without the use of vertical or horizontal bars that would have been needed for support if the design had been realized with the old tools and according to the old technique. These ribbon-like rushes that curl with such spontaneity in the six repeated panels would lose all their gracefulness if we had to view them against a background of supporting uprights. Here we have lightness and daintiness without sacrificing solidity. The gate remains a separation,—a boundary marker—but does not become a mask or a wall shutting off or obscuring the view of what lies beyond. When a grille is intended as a screen, Brandt crowds his ornament together until the entire surface appears covered, as in the remarkable door, *"L'Age d'Or,"* in which botanical circles are used to form a pattern. This is the door in which are incorporated three sculptured groups in modeled copper, the work of the sculptor Max Blondat, set in octagonal panels.



HINGED DOOR GRILLE BY EDGAR BRANDT



GRILLE DOORS BY EDGAR BRANDT



BALCONY GRILLE, "THE MUSICIANS," FROM THE MUSIC ROOM IN A HOUSE IN NICE, BY EDGAR BRANDT

COPYING *VERSUS* CREATING

BY

SHEPARD VOGELGESANG

AS a statement of the point of view of conservative designers, this is perhaps a fair example: Contemporary life moves so rapidly and is subject to such varied influences that the creation of a form vocabulary constituting a style is a practical impossibility. Hence it follows that a rushed age should accept the forms created by periods with more leisure for beauty. The architect is presumably an individual sensitive to beauty, so an architect is selected to supply the æsthetic vibration to the past which his client has not himself had sufficient opportunity of acquiring.

There is no denying the acceleration of present-day life, nor can anyone,—least of all an American,—deny the multiplicity of influences brought each day from world-wide sources and complicated by a highly technical existence. That an ordered expression of this complex existence and this embarrassment of influences can be attained by choosing beauty from the past, almost refutes itself. The full appreciation of beauty makes such varied demands on the intelligence and emotions and is such an individual and period matter that a permanent majority in the electorate, —or indeed any majority at all,—is itself impossible. Where today are the enraptured admirers of Carlo Dolce and Guido Reni? Yet in the Victorian age they occupied the place that Giotto and the so-called primitive dominate today.

The establishment of the architect as arbiter of the æsthetic past is a clear acknowledgment of his theoretical position in this country. Though such may be his theoretical position, it has all the cold comfort of too perfect a theory. Practically, his authority is tempered by suspicion. A mute, carte blanche client is a rarity. This condition of affairs leaves both architect and client in the possession of merely a pleasant mutual delusion. With other professions which do not deal in the intangible media of taste and historic association, the client surrenders his judgment more completely to the recognized technician. The evidences of his own lack of training are too visible, and their consequence too likely to result in palpable disaster!

In the past generation McKim, Mead & White and others, through often grandly conceived and superbly executed work, emphasized the style element in design to the American mind. The shift caused by the rise of wages and the multiplied technical and luxury demands on incomes changed the condition of architecture from feudal simulation to practical necessity. There arose problems of a nature that discomfited feudalism, and architects, clinging to what had been expected of them, did as best they could. The fault in the position of the architect lies largely in his decay as a technician. It is easier to relate this than to define the meaning of "technician." An architect is technically trained to the convenient ordering of the spaces of a building, and he is acquainted with the best materials and means for the execution of his arrangement. Since the time of Vignola and the incorporation of detail for its historic value, a further side of his technical equipment has suffered,—namely, his complete sensitiveness to the life of his own time. Architecture from the Renaissance to almost the present generation became largely a matter of providing a flattering setting for life with an eye constantly on the past.

To surround oneself with reflected glory from the Greeks and the Cæsars, to be influenced by one's acquaintance with the cultures of Greece and the Orient, was the aim of this time; these counted for the realities which the architect was to express. The development of science and the consequent machine age, whatever their evil effects may have been, added other realities. The demands for space and for order made by the machine created a new discipline and scale never before found necessary. Science extended man's conceptions and power, and the machine produced the quantities and the materials which the new conditions demanded. Trained too long for a charmed circle, the architect held back, not sensing the change from providing for the favored few to the accommodating of the multitude. He acquainted himself reluctantly with the means of realizing the new demands of life, and persisted in designing for display rather than frankly accepting his problems and amplifying his technique for their solution. It is not style that is needed,— it is technique; it is a sense of present-day life, its acceptance and adjustment to what is fundamentally human. For this the architect needs an understanding of all styles in their human relationships; the vision to conceive the problems of the present age; the intelligence to give them an orderly and rational solution, and the imagination to use the materials afforded him with a sense of their intrinsic dignity. He needs a public imbued with the fire of beauty in original creation, people to whom life in art matters more than pedigree, and he will give his clients that subtle thing called style,—the balance between man's spiritual and physical needs,—not an arbitrary creation. When style is recognized, it is, like the canonized saint, long dead and exhaling a faint fragrance, which in the case of style is called beauty!

MODERN ART

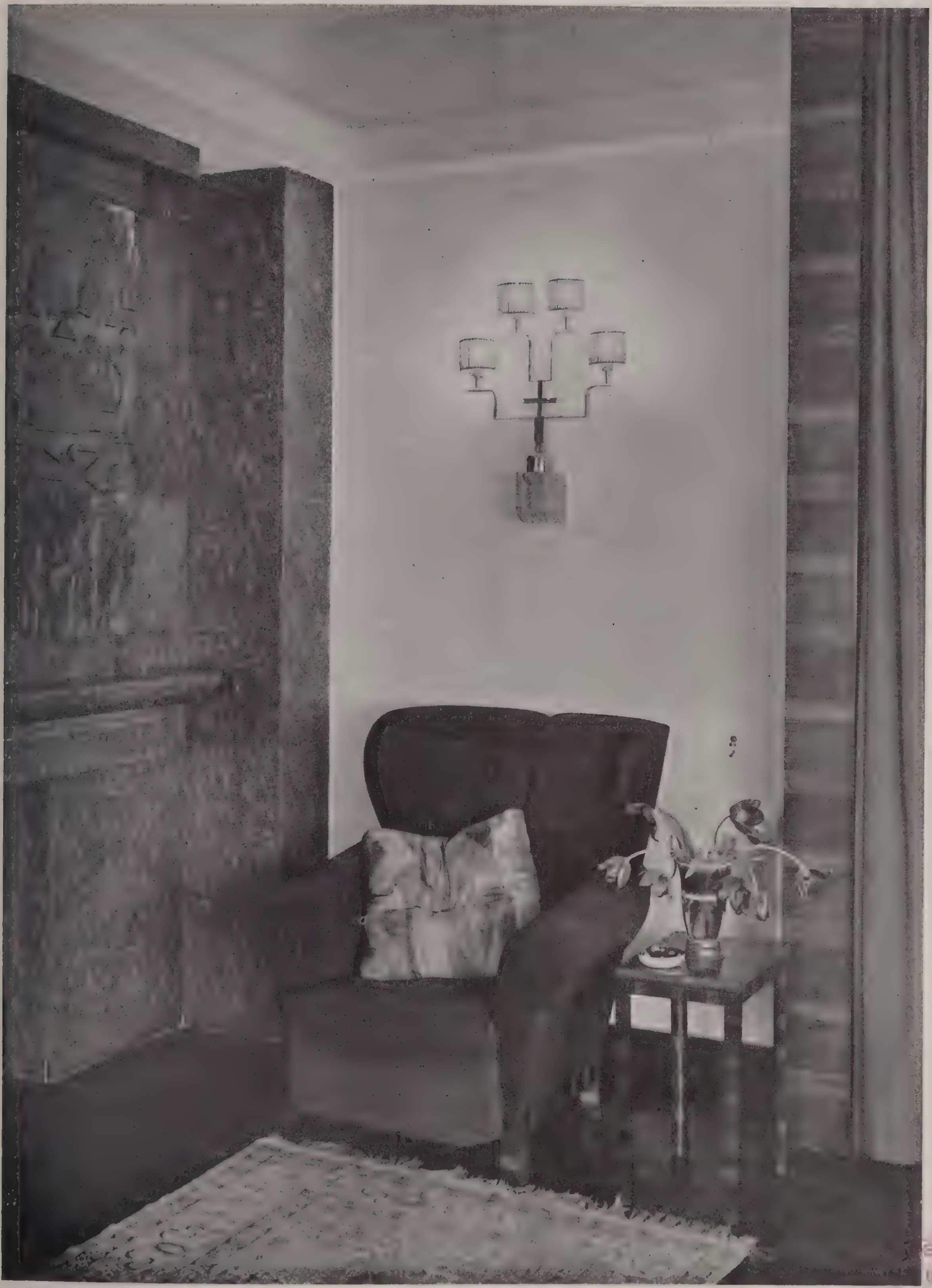
BY

BRUNO PAUL

THE "modern" thought of the present times has entered upon all fields of art with a most revolutionizing effect. This influence of new thought extends to all civilized countries of the world and affects the pictorial arts, painting, architecture, sculpture, literature, and music in equal degree. New rhythms, a new pace, new harmonies, heretofore unknown, in music, color and words, all are evidences of the transformation and the change of attitude toward old established conceptions. In view of the fact that this movement has been taking place in the various fields of art during the course of the past three decades with much similarity and simultaneously, we become aware of the fact that it is more than a mere whim of the times. During the past 50 years all distances have been reduced to what would appear as a fraction of their actual extent. The radius in which the life of the individual evolves has been proportionately enlarged. Individual and universal capacity of production has been increased by the use and the improvement of machinery. Organization of traveling facilities, exchange of merchandise, circulation of money and the building up of capital have undergone fundamental changes. Public matters are dealt with more and more with thought of a social union. As a consequence, man is compelled to think and to live in a manner different from that of past years. He has shortened the darkness of the night by means of the electric light and thereby has lengthened the day; he spans distances with increasing rapidity; he has elevated production of labor by combining creative energies, and to this end he constructs for residential and commercial uses buildings which over-tower one another and which appeared to be technically impossible a quarter of a century ago. Even man himself does not

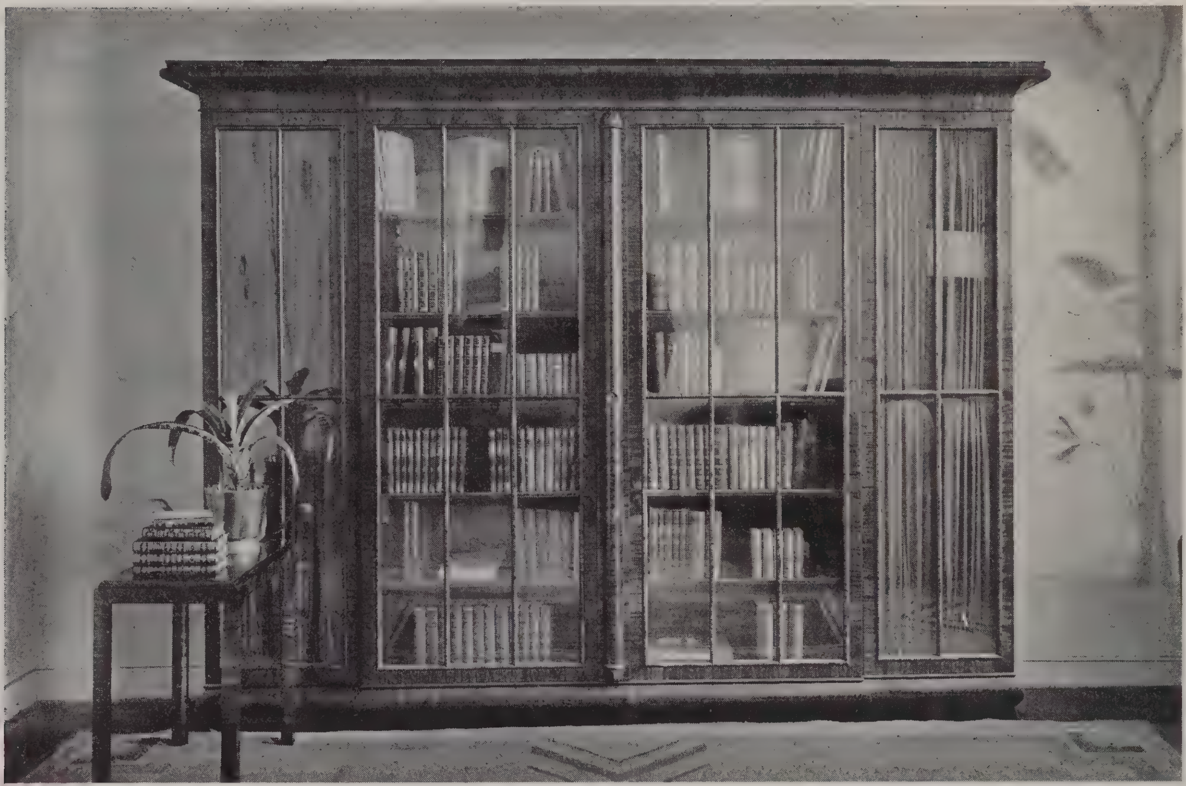
Cupboard, Stool and Rug in the Modern German Style

Marble Top Table and Lighting Fixture in the New Style



STON
BLIC

The Green Marble Mantelpiece and Black Marble Floor Contrast Harmoniously with the Deep Blue of the Chair and the Silver Walls in this Modern Interior



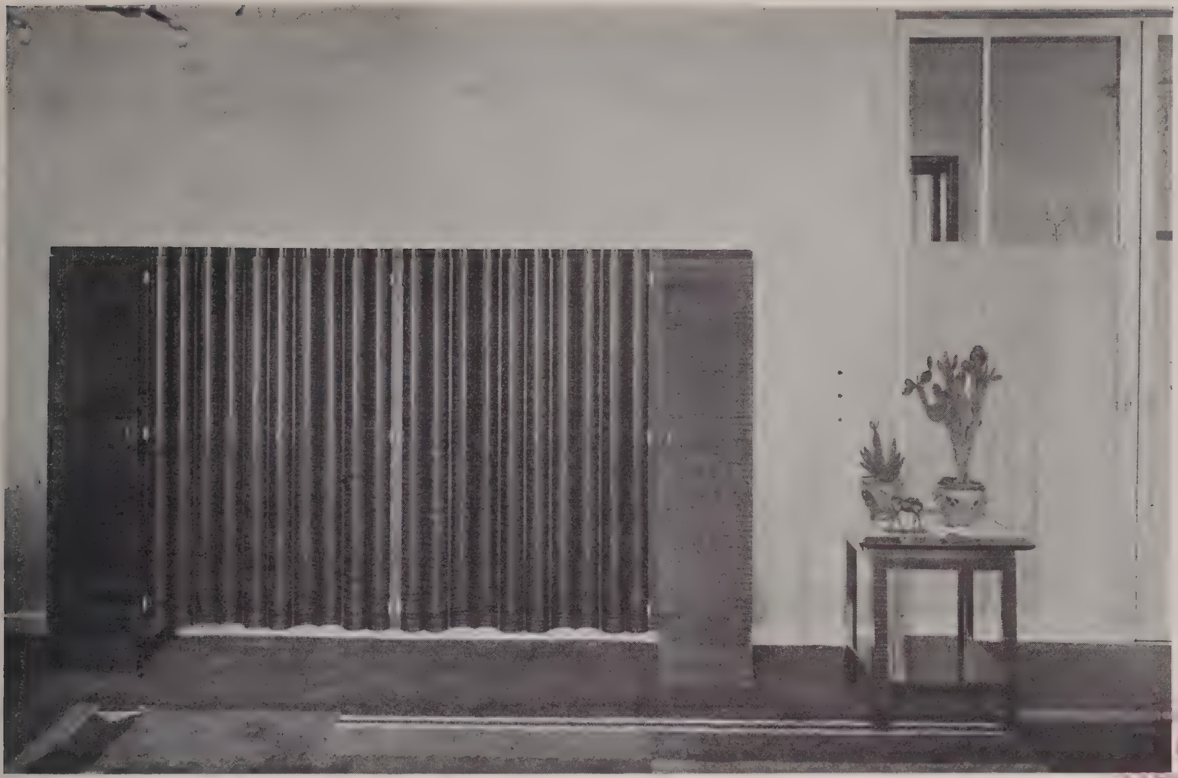
Although Modern in Feeling, a Conservative Note Controls the Design of this Enclosed Bookcase

appear the same in the twentieth century; the arrangement of his time is different, his rate of motion has changed, and also his clothing. His education at home and in school is different. He is finding new forms of expression for his inclinations. No period in the development of the civilization the human race has undergone has crowded fundamental changes into so short a time.

As a natural consequence, this period has also manifested a desire for self expression in the various fields of art. In fact, this self expression has taken form. All attempts to conceal by a historical mask the signs which are characteristic of our development are vain efforts. A convincing proof of this are the streets of New York and the Brooklyn Bridge. Let us consider the Brooklyn Bridge. No architectural structure of former times resembles that of the Brooklyn Bridge, since this type of construction, by which so large a space was spanned by a suspended steel structure resting upon masonry, is new. This has created an unprecedented type of construction. All attempts to combine the gigantic impression of the new and unprecedented with architectural styles of historical periods have only served to prove the strength of the new element.

The finishing of the interior of a building is guided by modern thought in equal degree. Leaded windows of smoked glass, not permitting daylight to enter, dark walls and faded colors on imitations of genuine materials, do not possess the beauty which may be brought into life by employing the new technical possibilities. Bright daylight entering through crystal window panes, light colored walls, furniture coverings and rugs should be created to frame the modern mode of life, the beauty of woman and the attractiveness of her clothing. This new, unexplored trend is far closer to the natural emotions and inclinations of unrestrained people than the appreciation of things the æsthetic value of which is partially obtained by the knowledge of their respective histories. Children, for instance, reach by true instinct to the new, the unprecedented. This instinct in the child runs parallel with the vigorous artistically creative imagination and the pronounced artistic expression characteristic of the drawings and paintings made by children, and we, therefore, arrive at the conclusion that love for the newly created must be an important factor of creative talent,—and that to further and develop their creative ability should always be the highest duty of the educator. They are so important that they should not be restricted by training in the acquisition of knowledge, since it is of greater importance to create than to administer and employ the already created. This touches upon the field of education in art.

The highest law is the encouragement of the pleasure derived from original creative ability. The artistically talented youth creates from his imagination things which pertain to his radius of



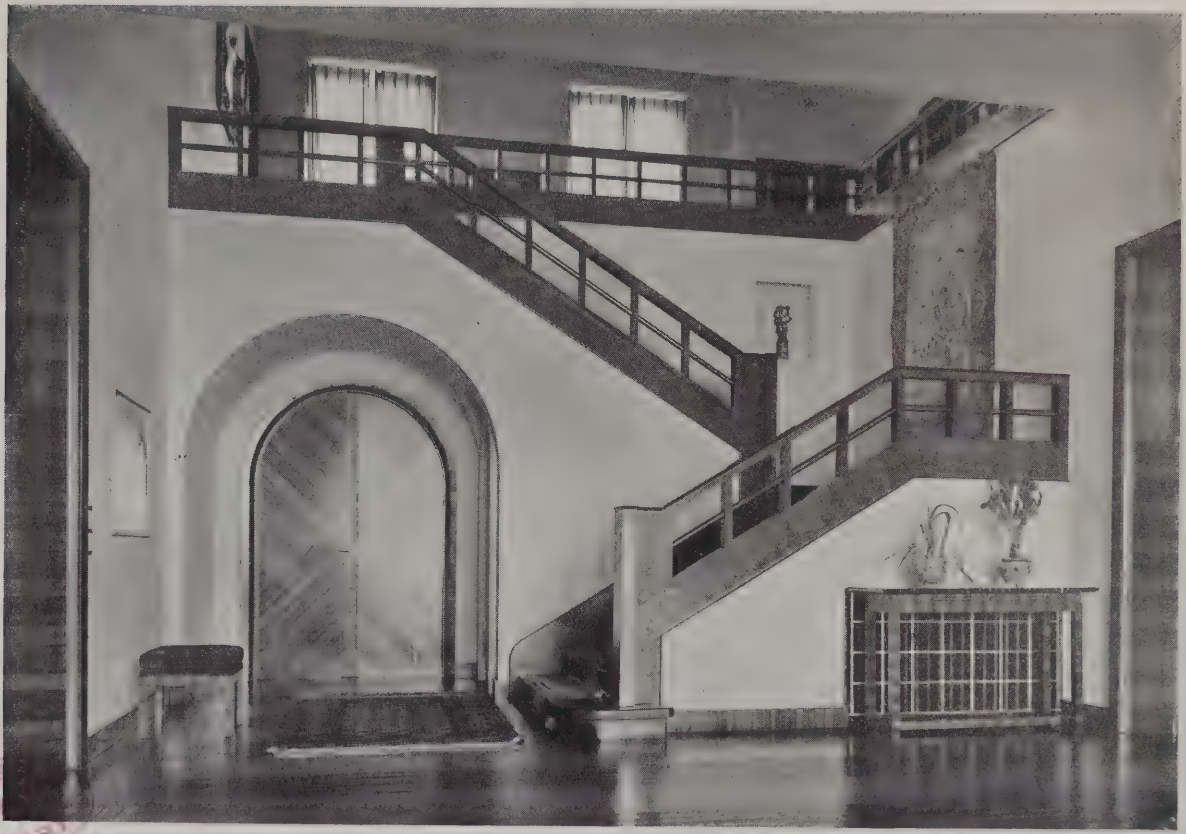
BLIC

A Sideboard Executed in Rich Brown Tigerwood

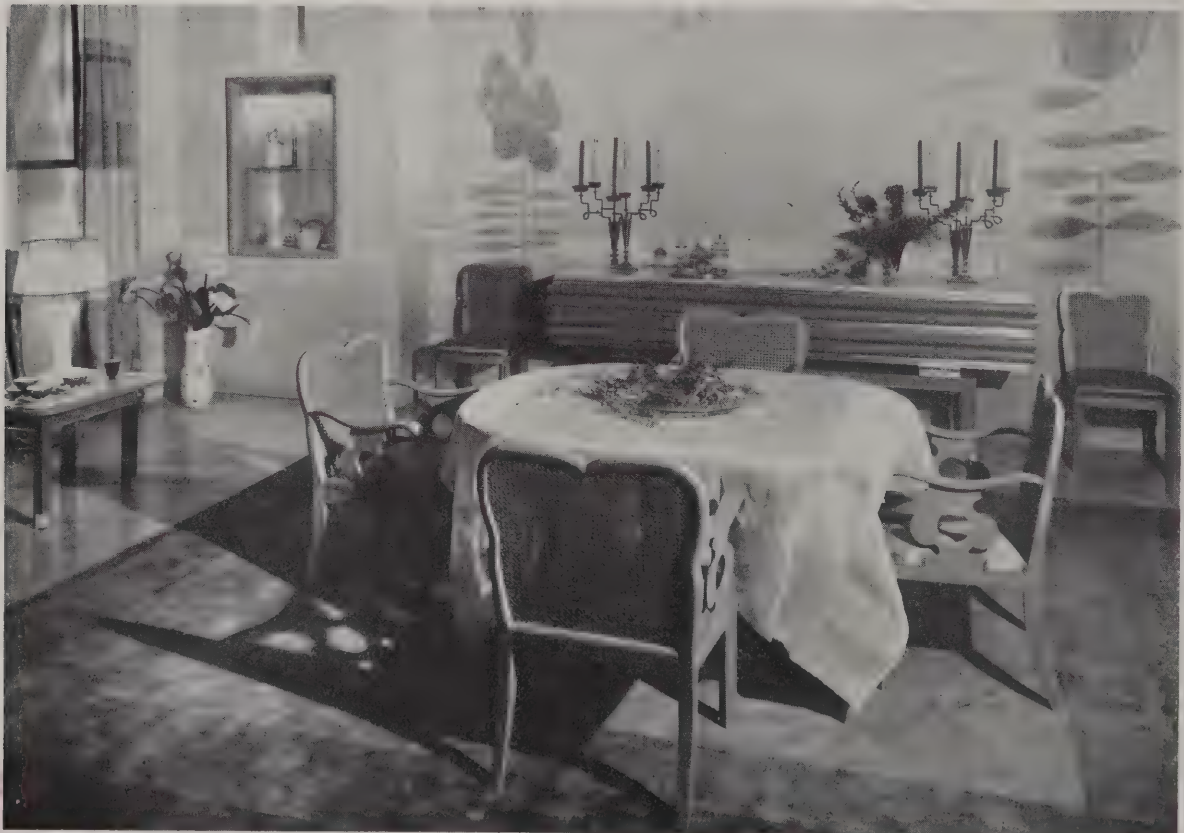
interest. He draws flowers, people, animals or landscapes, aëroplanes, autos or railways with an unrestrained, impulsive emphasis of the outstanding feature in form and color. These are reflections of the impressions gained by the senses, which in most instances by their direct and unrestricted characteristics reach the border of the fantastic. It is most necessary to carefully guard the psychic susceptibility of youth and its ability to give to these pronounced impressions equally pronounced formulation. It is a known fact that this spring of artistically pronounced expression in most cases very suddenly ceases when the pupil is put to the task of drawing accurately from nature and to making a controllable, exact reproduction of what he is looking at. This may be explained by the fact that in the attempt to achieve perfection and to make a photographically correct reproduction, measures are set which cannot be combined with the unrestrained, fantastically inclined imagination. These critical measures are also detrimental to the naïve self-assurance and confidence of youth. It is likewise a mistake to begin an education in art by the method of copying old masterpieces. The perfect technique of form and color of the masterpieces places the ability of youth at a disadvantage, while the very value of this ability does not lie in the routine command of material and task, but in the strength of his unrestrained creation and naïve self-confidence. It is not to be understood that these two methods,—that of the exact reproduction of an object and that of the study of masterpieces of former periods,—should be omitted in the education in art. They both are and will remain important factors of education, and they become more valuable to the pupil as he advances in ability and in his appreciation of artistic values. The best principle of education for the beginner is the practical study of the material by manual work. Just as for thousands of years no education of the artist was known other than that similar to apprenticeship in the workshop of a master, in which the most beautiful pieces of art for buildings, plastic, paintings, metal art pieces, fabrics, and so on, were produced, the young artist is now placed in the workshop where the material of his profession or of his special inclination is present, and he is allowed to learn from manual labor.

The foundation of a good education lies in the realization of the fact that the imitation of genuine materials by cheap substitutes can produce only low grade results, and that only in the use of genuine materials, and in good workmanship, either by hand or by machine, can a work of art be had.

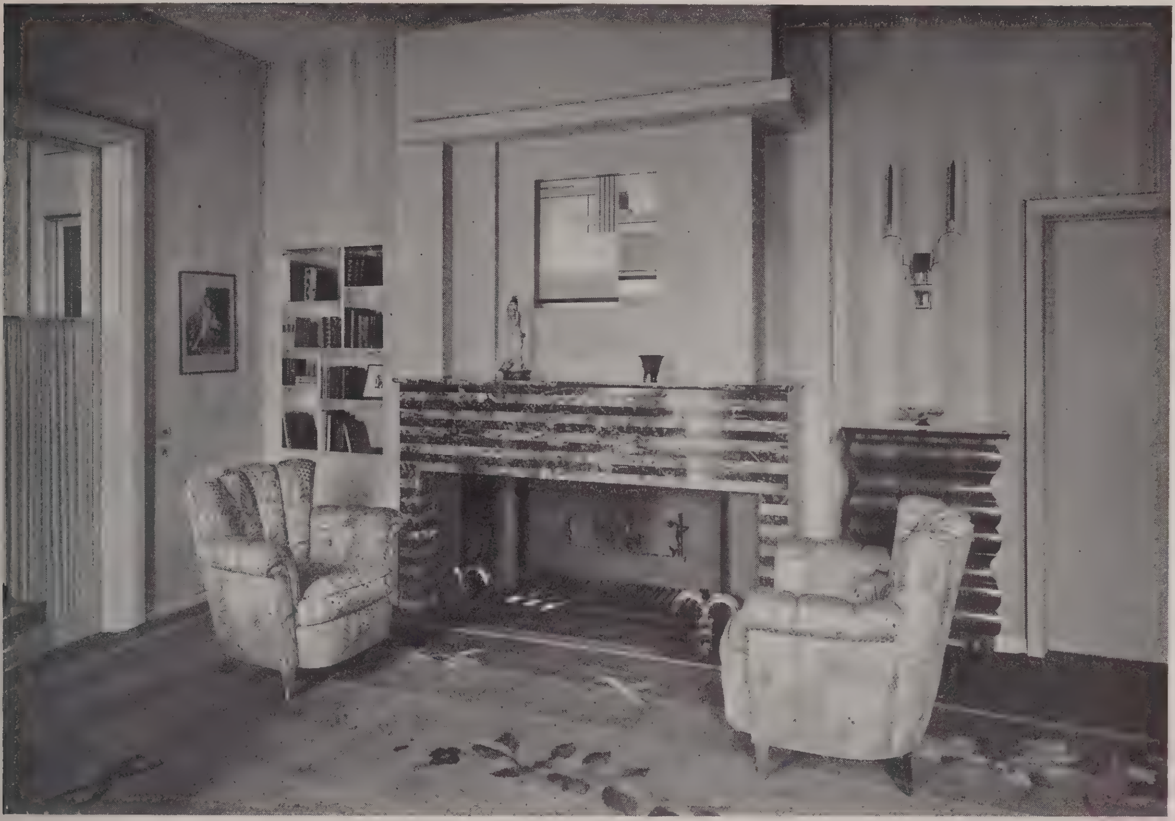
Editor's Note: The foregoing article is a translation of the address Professor Bruno Paul delivered in New York last spring. This translation was prepared for and approved by Professor Paul for publication in The Architectural Forum. Illustrations were loaned by Lucian Bernhard.



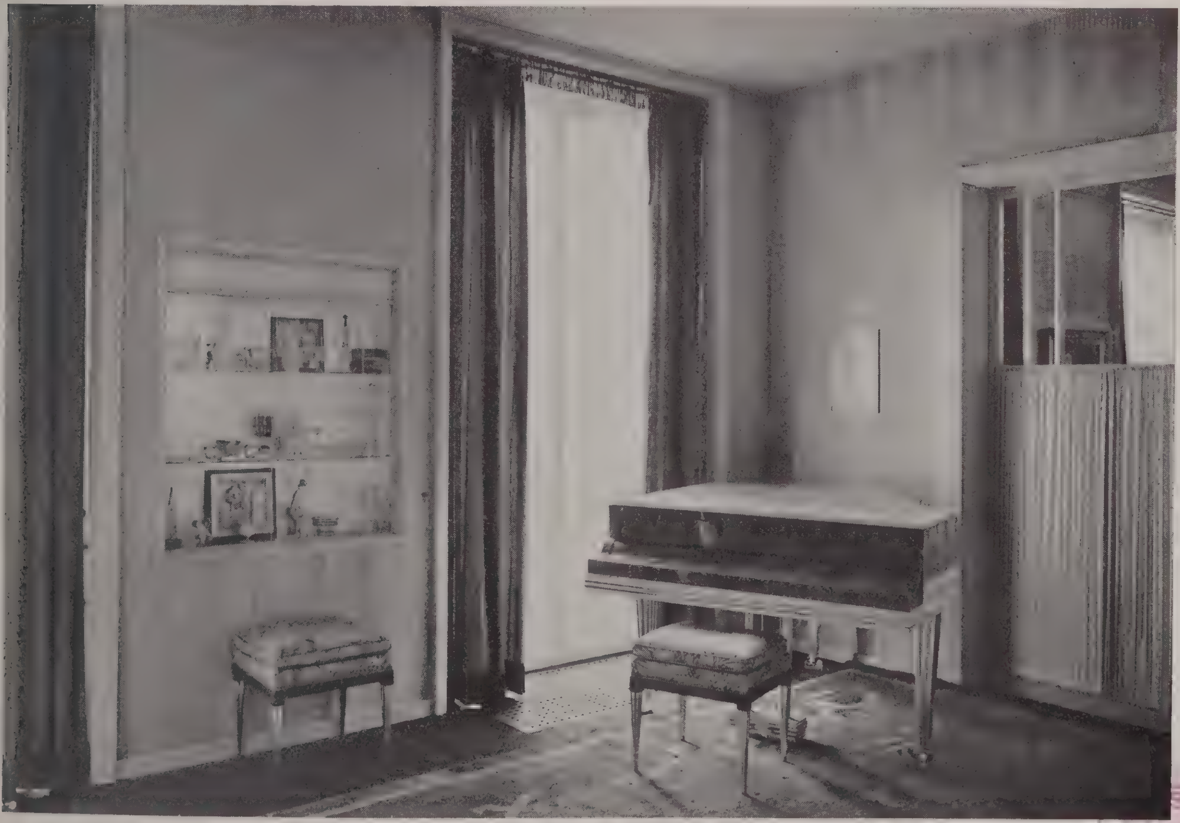
Simplicity and Angularity Almost Japanese in Character Distinguish this Modern Stair Hall



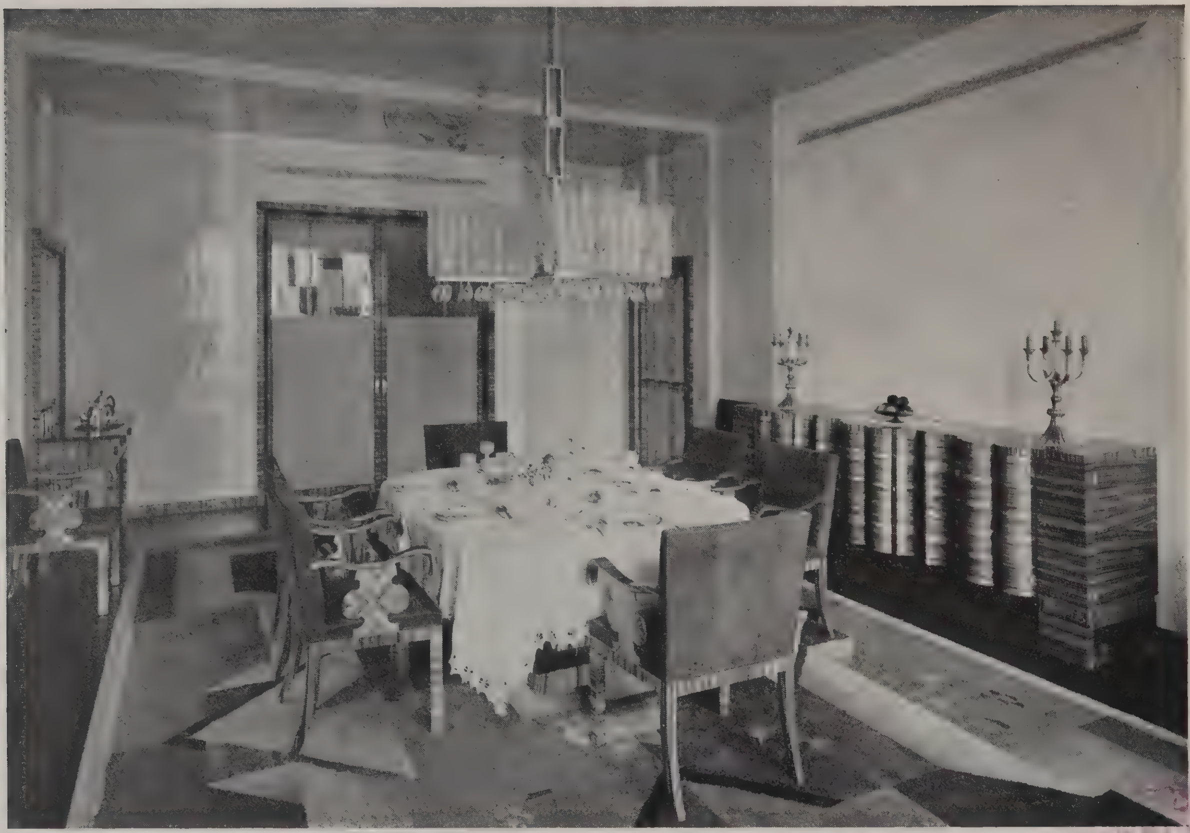
A Modern Dining Room Shown at Macy's International Exhibition in 1928, Designed by Bruno Paul, who is Recognized as One of the Founders of the Modern Art Movement



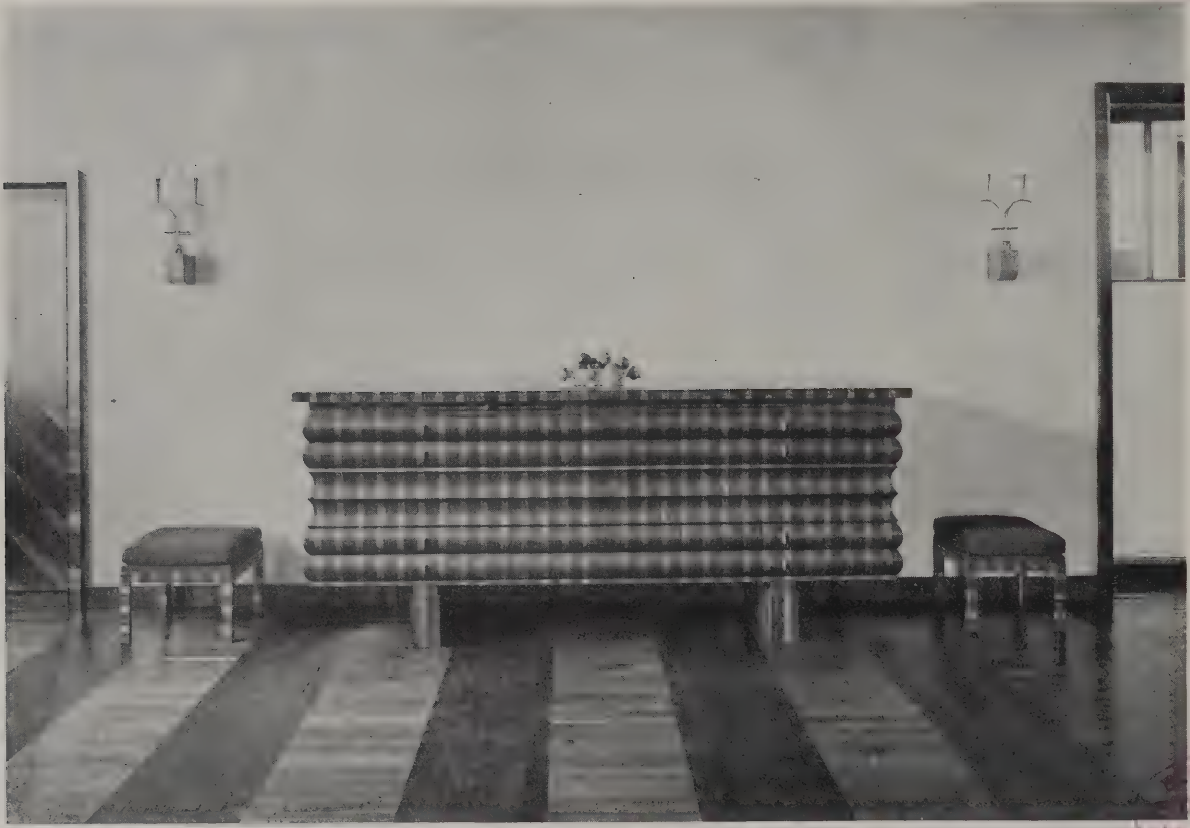
Although Modern, the Chairs are Comfortable and the Marble Mantelpiece Interesting



Two Views of a Modern Living Room in Which Color and Simplicity of Line and Mass, and an Interesting Wallpaper Give Distinction



Rug, Chairs, Sideboard and Center Electric Light are Good Modern Designs in Dining Room Furnishings



In the Floor as Well as in the Chest of Drawers Several Kinds of Wood are Used. Plain Wall Surfaces in Rich Color Well Set off the Dark Toned Wood of the Furniture

7.a

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BOOK DEPARTMENT

OLD HOUSES ON LONG ISLAND AND STATEN ISLAND

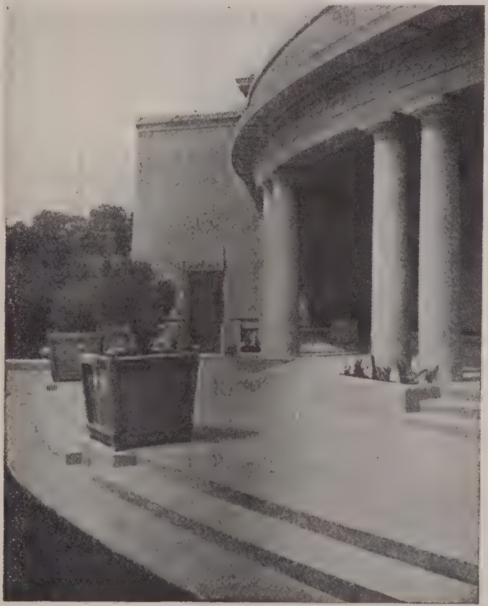
A Review by MARGARET NORRIS

SOME of the most valuable documents of American architectural history are found in the old manor houses built in colonial and revolutionary days by the early Dutch and English settlers on Long Island and Staten Island. A few of these are still standing in some show of their pristine pride; others are but ghosts of their former selves, if not wholly derelicts and eyesores; many more have vanished entirely, swept away by the relentless march of what is known as "improvement" in a growing neighborhood. But the traditions they represent are immortal, and the names of the men who lived there, many of them sustained throughout the generations, are still well known today. Many of these traditions and names belong to families prominent today in social, political and economic New York,—Vanderbilt, Lefferts, Cortelyou, DeWitt Clinton, Van Brunt.

In his book, "Manor Houses and Historic Homes of Long Island and Staten Island," the author has done much to reconstruct the early glory of these architectural treasures and also to revive their significance from a historical standpoint. Many of the stories he has retold form part of our richest traditions of the America of those early days,—rooms where General Washington actually passed a night; where Nancy Cortelyou waved her red petticoat to signal the British troops; and where the ghost of Lord Howe returned to stalk the premises each anniversary of the Battle of Long Island. There are stories of pioneer struggling, of witchcraft and whipping posts, of gaiety and romance in war and peace, and of bargains made with the Crown and with the Indians at different times during the period.

Architecturally speaking, says the author, Long Island is like a block of Neapolitan ice cream,—divided into three distinct layers, one pure English, one pure Dutch and, joining the two, a third layer that partakes of both influences,—that is Anglo-Dutch. The architectural cleavage corresponds to the racial cleavage. Eastern Long Island architecture is largely of purely English derivation. This, the largest third, comprises the old East Riding section,—what is now Suffolk county, Southampton, Easthampton and that neighborhood. The western part, comprising the old Five Towns, is just as purely Dutch. Many of the original old houses here might almost have been transported from Holland. The middle section, now part of Nassau County, partakes of both English and Dutch, settled by people of both bloods.

The Dutch houses on the western end of the Island, including Brooklyn and Staten Island, show more variety of treatment, since the Dutch builder was an opportunist who very frankly made use of whatever material was readily at hand,—lumber, brick, stone or stucco. The eastern Long Island Englishman, however, was so



Architectural Design in Concrete

By T. P. Bennett, F. R. I. B. A.

THE great utility of concrete as a material for building lends importance to any work which deals with its use. Already centuries old, with its splendid durability and permanence amply demonstrated by structures of many kinds which have already been used for ages, concrete is one of the most valuable of all the substances used in building and engineering of every kind. Its very adaptability and workability give it a value possessed by few if any building materials, and its value is often enormously increased by the use with concrete of steel reinforcing which adds a strength which it never possessed before. "Reinforced concrete has earned its front rank position among materials for permanent construction because of its intrinsic merits. Its fireproofness protects life and property; its strength and safety are increased by its monolithic nature; and its permanence is proved by long use."

THE text ot this work dwells in detail upon the working of concrete; details of construction; continuous vertical support; verticality; monolithic concrete; concrete vaulting; textures; "crazing"; and treatments; and other subjects of importance to the architect, engineer or builder concerned with concrete. It sums up and presents the experience of many successful workers in concrete construction. The volume deals with concrete and with its design as influenced or governed by its construction. Its authors have been fortunate in selecting admirable examples of the use of the material, and the work contains, among a large number of illustrations, views of residences, tall structures such as hotels, theaters, power houses, or office buildings; bridges, aqueducts, retaining walls and walls of other kinds. The views are of work in more than one country, for there are illustrations of buildings in England, France, Belgium and Germany, as well as many of structures in the United States

Text and 100 Plates; 8½ x 11 ins. Price $10

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VOLUME I

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Edited by
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104 pp., 9¾x12 ins. Price $7.50

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entrenched in tradition that he would go to any amount of trouble to conform to the old ways, and was not happy unless he could do so. The chief difference between the two architectural styles is noted in the roofs. The English generally used the gable roof; the Dutch, the gambrel type. The gambrel roof, quite different from the gambrel often used in New England, is made in two parts with a sweeping curve in its longer or lower section and a graceful, bellwise flare over the eaves to shade the lower walls and shelter the tops of the windows. Sometimes these eaves projected still farther and were supported at their outer edges by pillars to form verandas. Such houses were generally of but one story, sometimes of a half-story in addition, lighted by windows in the gable ends,—less often by dormers. The English house usually had two stories, sometimes with dormer windows projecting through the roof to form a third-story attic. The Dutch houses, on the other hand, even the more pretentious as already said, had as a rule only one story and an attic. The long hollow slope of the gambrel would make a second story too airless. However, in some of the later houses that show Anglo-Dutch influences, we find dormer windows cut through a gambrel roof or a gabled wing added.

Many of Long Island's old English houses are of the "salt box" type so prevalent in Connecticut, the Island's next door neighbor, and in other parts of New England. The "salt box" is merely another name for the stack chimney house built around a great central chimney. The Dutch was flanked by two great chimneys, one at either end. The kitchen was the most spacious room. Its huge fireplace accommodated six 6-foot logs which were dragged from the forests by horses. Here were the old Dutch oven and those other now strange utensils with which the thrifty Dutch housewives worked such marvelous results. A typical example of the English "salt box" is the old Mulford house at Easthampton; or, better still, its more famous next door neighbor commonly known as "Home Sweet Home," because John Howard Payne, the author of that melody, lived here for a few of his early years. The now fashionable town of Easthampton recently acquired this house to preserve it as a literary shrine. This and the old Rufus King manor house at Jamaica, now known as "King Park," are the only two Long Island homes of famous men which have become public property.

In Brooklyn the original Lefferts house, built about 1685 in what was then the village of Flatbush, has been removed to Prospect Park for safe preservation. This house was partially destroyed by fire in 1776 but has since been quite perfectly restored. Other treasures of this era stand now either isolated and forlorn or have been entirely swept away by the ruthless onslaught of real estate booms. One house which, happily, has been preserved,—one of the most interesting from a social and economic standpoint,—is the old Vanderbilt house on Staten Island. It was here in 1794 that Commodore Vanderbilt was born, and from there that he first ran the ferry boat that marked the beginning of the family fortunes,—the wedge into transportation activities. His father before him, Cornelius I, had earned a meager living by running a ferry between Staten Island and New York, but he did it in a desultory fashion, as he did everything in life, for he was a restless person and

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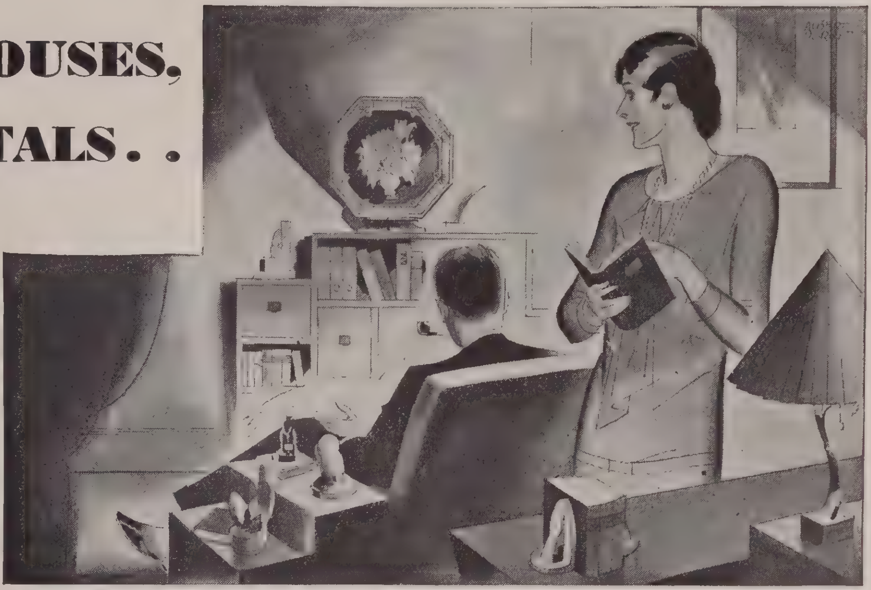

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with none of the persistence that distinguished his famous son. Discouraged by the long winters, when for days at a time he could not run his boat through the ice in the bay, he bought a bit of farm land in Port Richmond, built there a small Dutch house and thither brought his bride, Phœbe Hand, in 1787. It was there that their son was born. Phœbe was a remarkable woman. It is to qualities inherited from her that Cornelius II owed much of his success in life. He has been described by a biographer a a "lusty brat who from infancy was noted for his stature, his wilfulness and determination, his readiness to think for himself and go his own gait . . . of big body, rangy, towheaded, blue-eyed, as Dutch as the house in which he was born." Interesting bits of his story and that of other famous men who were born or who dwelt in these old manor homes are given in this book. Among them is the story that still clings to the old summer home of Governor DeWitt Clinton at Maspeth or Newtown, now Brooklyn, and which has long since fallen prey to the city's greedy encroachments. Once it was a dwelling gracious and distinguished,—in its heyday one of the largest and finest houses at the western end of Long Island. Now it is a half-dismantled tenement with some of its members lopped off, a pathetic wreck about to tumble down, a poor ghost of its former self. Built about 1740 by Judge Sackett of the Court of Common Pleas, it was a little later purchased by DeWitt Clinton.

MANOR HOUSES AND HISTORIC HOMES OF LONG ISLAND AND STATEN ISLAND. By Harold D. Eberlein. 318 pp., 6½ x 9½ ins. $12.50 Net. J. B. Lippincott Company.

HANDBOOK OF DOMESTIC OIL HEATING. Edited by Harry F. Tapp. First Edition. 383 pp., 4½ x 7 ins. Illustrated. Price $3. American Oil Burner Association, Inc., New York.

THE interest which attaches to discussion of a subject as important as the use of oil as fuel has been considerably stimulated by the publications of one kind or another issued by the American Oil Burner Association, Inc., an organization composed of many of those interested in the marketing of oil and those concerned with the designing and manufacture of mechanism for its use. The matter has been the subject of countless articles in journals devoted to architecture and engineering, and those interested in the use of oil have sponsored research which has removed the subject from the realm of the superficial or theoretical and has brought it to a point where the use of oil in appropriate mechanism has been made almost an exact science.

Far distant are the days when the type of heating plant and the square feet of radiation necessary to heat a structure could be determined by a casual glance from the local plumber. Modern heating engineers who attempt to solve these problems must have a thorough knowledge of the effect of different construction materials upon the heating requirements of a building, whether it be of brick, brick veneer on hollow tile, hollow walls with stucco finish, limestone or sandstone, cut stone veneer on concrete walls, wood siding or clapboard walls, or wood shingle walls. The engineer knows, too, the significance of the number of windows in a room, the presence of a fireplace, the location and kind of exposure, and the importance of such things as piazza

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These are some of the matters explained authoritatively in the new and revised edition of "Handbook of Domestic Oil Heating." In this new edition, the first revision of the Association's Handbook in two years, a definite effort has been made to eliminate all obsolete material and to include new data for which those at work in this fast growing industry have felt a genuine need. At the outset, the editor has carefully defined and explained the words, phrases and terms in heating and ventilating practice, in oil technology and in oil burning, so that even those most unfamiliar with these subjects will be able to read the book with understanding and profit. This clarity of exposition is an outstanding feature of the entire work. Its 383 pages contain 55 tables and 153 illustrations and charts. Whether it is discussing radio "interference" and oil burner operation or analyzing the different kinds of oil burners and controls, there are always near at hand a sufficient number of illustrations, tables and charts to explain them.

Not content with giving a history of the use of oil as fuel, the editor has assembled all of the facts about petroleum that may be of practical use,—production figures, methods of recovery, distilling and refining, pumps and storage, and characteristics and properties of fuel oils. There is a discussion of fuel oils' combustion and of the principles upon which modern oil-heating equipment is designed and built. A particularly well illustrated chapter is devoted to description and analysis of the different types of oil burners and controls. An excuse for its thoroughness,—if excuse be needed,—is offered in the opening lines of one chapter: "The rapid growth of domestic oil heating has been the inspiration for many engineers to spend much thought, energy, time and money, making for perfect oil-heating equipment. Much of this energy is wasted when the work is attempted without a background of knowledge of the experience of the pioneers who developed and applied the various methods of preparing fuel and air for efficient combustion."

The oil burner is, after all, only one unit in any satisfactory oil-heating installation. Three entire chapters of the Handbook are given over to a detailed study of boilers and furnaces and the different types of heating systems. The principles and characteristics of each type are carefully described and well illustrated with drawings. In addition, there are presented the problems of oil-heating applications peculiar to each type. There may be found in the volume a model ordinance to guide city officials, practical data for architects, the revised regulations of the Board of Underwriters, steam tables, reliable and practical suggestions for inspection and survey of heating plants. There is important information for the guidance of installation and service men, with suggestions for tests. There are factual data covering the question of comparative costs, with tables.

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EDITED BY

C. STANLEY TAYLOR and VINCENT R. BLISS

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The editors have been assisted in the preparation of the work by widely known hotel architects and interior decorators and by actual operators of hotels,—practical men, experienced in the management of the "back" as well as the "front" of a hotel. The volume's treatment of hotel furnishing and equipping constitutes the final word on this important subject. There are included views of hotel restaurants, cafeterias, kitchens, pantries, "serving pantries," refrigerating plants and all the departments which are necessary in a modern hotel of any type. *The work is of inestimable value to architects, builders and engineers, as well as to practical hotel men.*

438 pages, 8½ x 11¼ inches—Price $10

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THE 1929 EXHIBITION OF THE ARCHITECTURAL LEAGUE OF NEW YORK

BY

RAYMOND M. HOOD

I DOUBT if there are many people who realize that there are buildings going up in New York today that five years ago would have been considered freakish or too radical; and that today these buildings are accepted as a matter of course, without their being given a second thought. For within the past five years a change has occurred, so comprehensive and forceful that today buildings that would once have aroused only ridicule, are passed by without comment. The public, in an incredibly short time, has been educated to accept the architectural changes necessary to the growth of New York, and to regard its buildings in the light of reason, rather than to judge them by the standards of an era we have outgrown.

The movement which brought about this change took form after the close of the war. It arose from a universal restlessness and an unwillingness to accept things as they were merely because of habit. Besides manifesting itself in a social way, it very naturally showed itself in the fields of architecture and decoration. New problems, instead of being treated on the basis of tradition, were solved in the light of reason. Simplicity, practicality, directness, efficiency, became the watchwords of those who had new problems to work out. Skyscrapers, lifting their occupants out of the dust and turmoil of the streets, arose in crowded sections; interiors became more healthful; the products of the machine, conducive to greater happiness and prosperity, were welcomed by everyone. These were the elements of the modern movement that was slowly weaning the great mass of the people away from regard for traditions not pertinent to their life; but it was not until the European countries, particularly France, Holland, Germany and Sweden, had applied this new viewpoint to every phase of arts and decoration that America began to stir; and it was not until the Exposition of Decorative Arts in Paris in 1925 that America began to work along in the great movement to apply the principles of modernism to every phase of life. Our earliest efforts, based almost entirely upon European products, first showed themselves commercially in the shops in fabrics and in all manner of textiles. Then Lord & Taylor, Macy and Altman in New York, and Mandel and Marshall Field in Chicago, held expositions showing the modern treatment of interiors. All of this was looked upon as a novelty of the moment by the traditionalists,—as a fad that would soon die. But now the fact that the Metropolitan Museum of Art, the source to which all America turns for direction in matters of art, is preparing an exposition of contemporary art; that the expositions of the Architectural League, the largest single exhibit of art and architecture that we have in this country, have swung to the contemporary trend; that the coming Chicago World's Fair has ignored traditional sources and is trying to solve its problems in the manner of today and not of yesterday, show that the modern movement is on solid ground.

It is this manifestation of modernism in all forms of art and industry that has helped to bring the equally rapid recognition of modern architecture. Only four short years ago, when I was building the American Radiator Building, I was very severely brought to task by one of the greatest banking institutions in the country as being ultra-radical, when a loan for its completion was applied for. I was told that even though I had clients willing or anxious to build such a structure, I must realize my responsibility as an architect to protect the public from such atrocities. Upon its completion, the building was ridiculed by a great part of the public, but today it has taken its place as a perfectly conventional structure, and other buildings of a more unconventional appearance have sprung up without arousing criticism.

For over 40 years the Architectural League of New York in its annual exhibit has represented the most conspicuous movements of the time; and, although a very conservative body, its exhibits of the past three years have reflected the architectural and decorative methods in use today. But its exhibit in the Grand Central Palace next April is going further than ever in displaying under one roof the products of the material and supply men. Ever since the modern movement began, the producers of materials for building and decoration have kept pace with the architect; yet, until recent years their products, an integral and highly important part of the modern movement, have never been given a proper display. This was partly because the public was not yet in a mood to stop, look, and listen sympathetically, and partly because of lack of space. True, the League has always given space to special foreign exhibits, and to the most important works of native craftsmen; but it has never presented in a comprehensive way the various essentials that enter into the construction of a home or building. This April, however, products of all these various fields will be a part of the big show, and the public will be able to get a good idea of the strides made in those spheres, and of the vast equipment for increasingly beautiful and modern construction that is now available.

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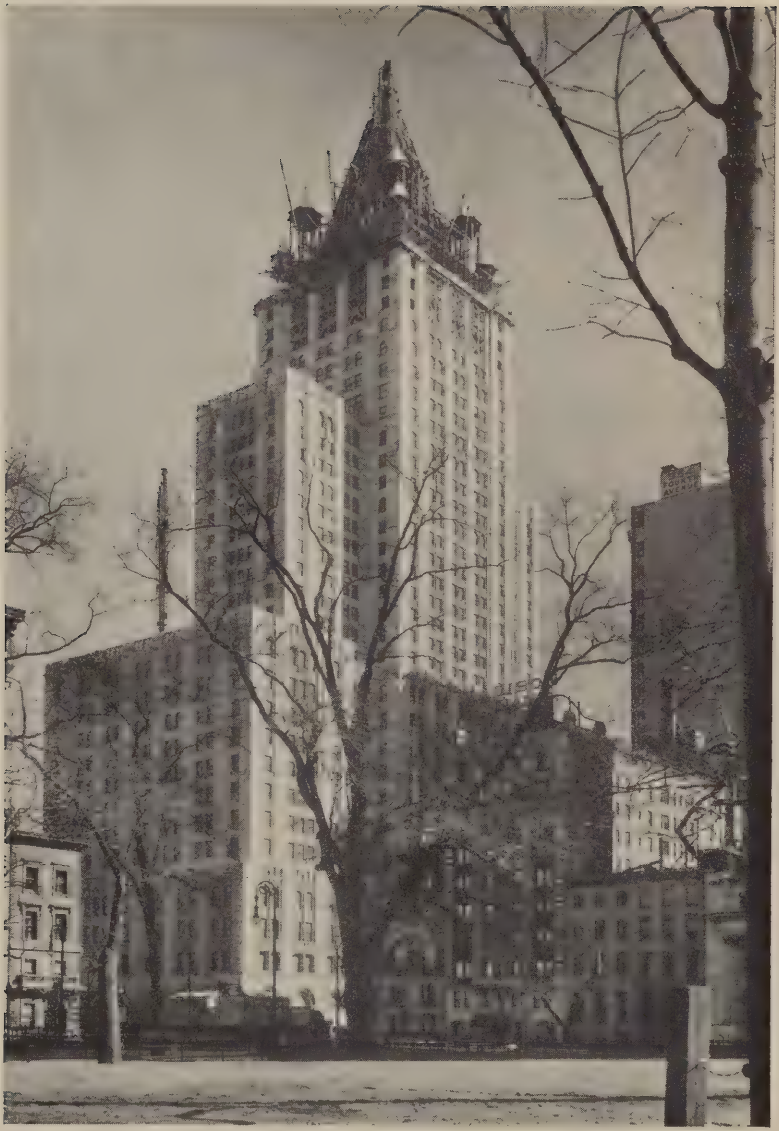


Photo. P. A. Nyholm

THE NEW YORK LIFE INSURANCE COMPANY BUILDING

CASS GILBERT, ARCHITECT

THE
ARCHITECTURAL
FORUM

VOLUME L NUMBER ONE

JANUARY 1929

USING SCALE MODELS ADVANTAGEOUSLY

BY

LE ROY GRUMBINE

WITH MODELS BY THE AUTHOR

THE first difficult problem that an architect encounters is that of salesmanship. He has to secure the coöperation of a client before he can produce. He has to sell something that does not yet exist,—something that probably requires the largest investment of anything the client buys.

The architect is an artist. Other types of artists,—painters, sculptors, poets, musicians, dramatists,—work more or less independently. They create by themselves. They usually produce first and sell afterwards. Their works sell themselves by direct appeal. The artist gets most of all of the money expended. The architect, on the other hand, usually gets only 6 per cent of the money expended. The artist creates art for art's sake. The buyer seeks art for art's sake. The architect applies art to a necessity. The buyer is seeking a necessity. So the architect, in addition to having to sell something that does not yet exist, has to sell his art in combination with a necessity, and in competition with those offering the same necessity without the art, at a lower price. And he has to sell 16 times as much per dollar earned! The qualities that make an artist and the qualities for successful salesmanship, are seldom found in the same individual. It seems as though they are the antitheses of each other. Witness the many instances where architects who are capable designers struggle all their lives with small practices, while the incompetent enjoy large and lucrative practices in spite of the many eyesores they are continually erecting.

How can an architect best demonstrate his value? Prestige is long and tedious in building,—never more so than in the case of an architect, because of the magnitude and rarity of the units he deals with; a doctor or lawyer has a hundred cases to one commission of the architect. Besides, prestige, no longer has the value it once had. Things move too fast in this age. What was good a short while ago, may no longer be good now. New things are coming thick and fast. What is best for the case in hand, is all-important. Emerson's little "mousetrap" theory no longer applies. Competition is ever increasing, making it easier for the buyer, and since the human animal is so likely to take the easiest way, the successful seller must display his goods and take them to the buyer.

How can an architect do this? In no way so well as by means of a scale model. Not many years ago a nationally known shoe manufacturer of many years' reputation, lost two million dollars' worth of business in one year, simply because he continued to make a good thing in the same way. People of this age demand *new* things. The architect who presents his designs in model form, appeals to this demand. What is more enduring than building? What is more required by the people? What else absorbs as much capital? Even the sight of a modest residence has to be endured, or is enjoyed (as the case may be) by thousands of passers-by, daily. It continually irritates or pleases the owner and his family and guests as long as the owner lives there, which is the greater part of each day for a large part of his life. One is constantly in contact with buildings, either outside or inside, at home, at work, or traveling. Why should not buildings, of all things, be beautiful, and be made to give visual pleasure as well as to render efficient service?

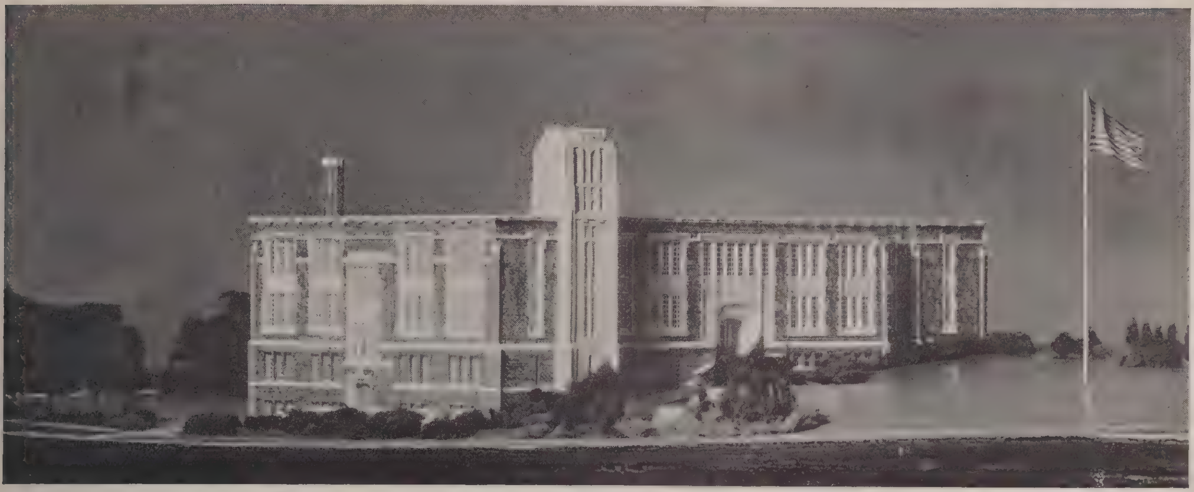
To help make buildings more beautiful, to eradicate irritating ugliness, to further the cause of good architecture, is the mission of the scale model. Most people cannot or will not take the trouble to visualize. Sales experts tell us that few people can be "sold" on reason. Most people must be appealed to through their appetites or senses. A model does this. It diverts the attention from dollars to be expended and focuses it on something to be desired. It gives the prospective buyer something tangible, something definite. It dispels doubt. It creates enthusiasm. The client is interested in what the architect is going to do for him, not in what he has done for others. The model removes the buying of architecture from what is akin to a mail-order-from-catalog description, cash-in-advance matter, to a see-it-before-you-buy proposition. A model gives the architect the advantages other artists have,—of expressing himself independently of commissions; of creating first and

One-sixteenth Inch Scale Model of Longue Vue Golf Club, Pittsburgh
Bruno Janssen, Architect
A. D. Taylor, Landscape Architect

letting the result sell itself. It gives him a chance to display his wares immediately, without having to rely on prestige or to wait for a client.

All the elements that enter into the artistic side of architecture (and they are the same in all the various arts),—namely, form, color, harmony, contrast, composition or grouping, and central feature or climax,—can be as well portrayed in a scale model as in the building itself. To what extent a building approaches an architectural ideal, or is merely a constantly irritating eyesore, is determined by the preliminary studies (or lack of them). It is a mistake to put off making the model until various points have been decided and the preliminary scheme accepted by the owner, on the theory that it is useless to have a model if it's not going to be like the finished building. It is to help decide how the building shall look that a model is most useful, so obviously the model must be made before the decisions are made. It is not at all necessary that the model conform to the completed building in all details. The model should be the architect's presentation to the client of his design. Appropriate floor plans and section drawings, to show the interior arrangement, should accompany the model, but no rendered elevations or perspectives are needed. It is possible to use models effectively in this way, and the cost is not prohibitive. Models should be treated in the same manner as perspectives. They should of course be truthful, but photographic exactitude should not be attempted in one case any more

Model of Children's Hospital, Cincinnati, with Future Additions
Stanley Matthews—Elzner & Anderson, Associated Architects

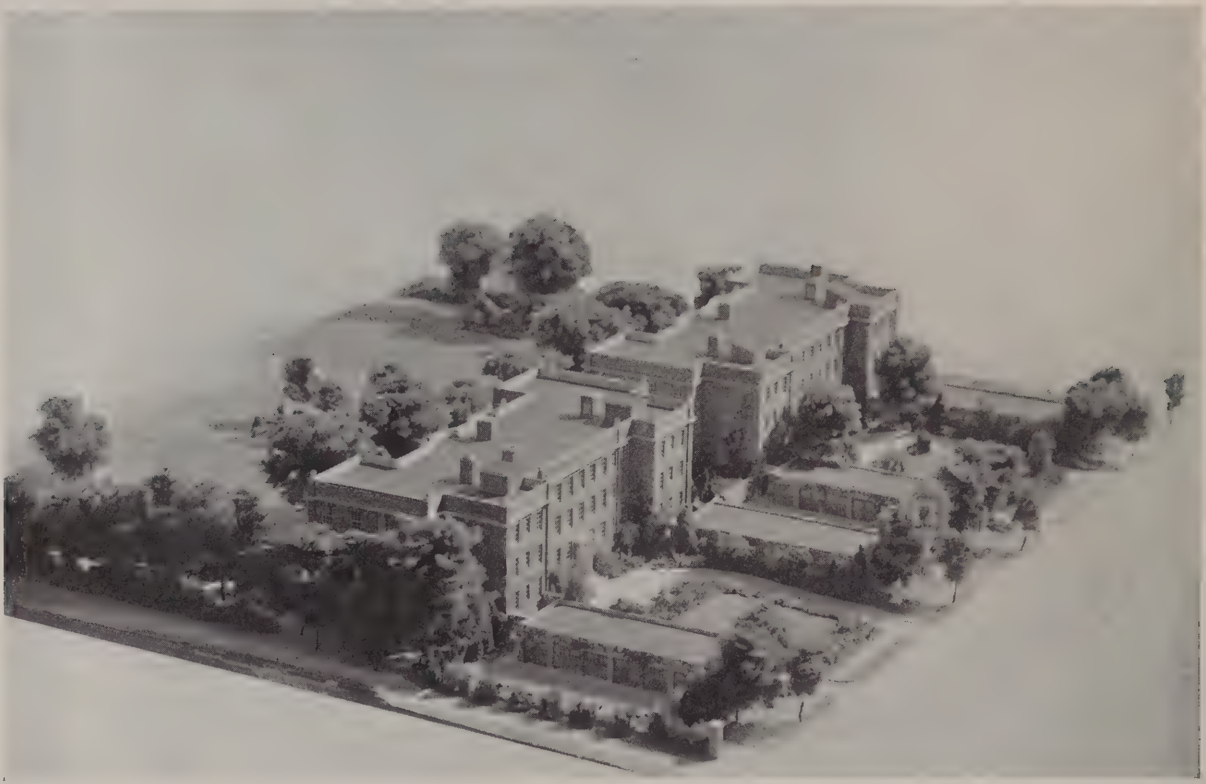


One-sixteenth Inch Scale Model of Coventry School Building, Cleveland Heights
Franz C. Warner, Architect

than in the other. Models should not be too elaborate. They should be "sketched" in the same way a perspective would be. Only the essential features should be shown. For this kind of a model, cardboard is the best material to use. It can be laid out and cut out with T-square and triangle on the drafting board. It takes various color mediums well and admits of "rendering" textures of materials and minor details. For the best effects and because of the exigencies of the materials used, a scale should be selected that will make the model 1 to 2 feet long. One such model usually can be made for what two or three perspectives would cost. As a model makes rendered perspectives and elevations unnecessary, it really costs little if any more to present a study in model form than by the customary perspectives and rendered drawings. Sketch models of two or more schemes, by which to compare relative merits, are of more value than one more detailed model later on.

The architect will find a model helpful to himself, in working out the design. As an illustration, take a tower with an octagon top on a square base. The writer's experience has been that invariably, although the drawings show ideal proportions, the model reveals that the top has been designed too narrow for the base. This was true even in a case where a carefully laid out perspective, taken at the 45 degree angle as a check, failed to reveal what the model showed. Where two or more architects, or architect and landscape architect, are associated on the same project, and one

Model of the Hardesty Residence, Daytona, Fla.
Martin L. Hampton, Architect; E. H. Ehmann, Associated
A. D. Taylor, Landscape Architect



Model of Garden Apartments, Cleveland
George B. Post & Sons, Architects
A. D. Taylor, Landscape Architect

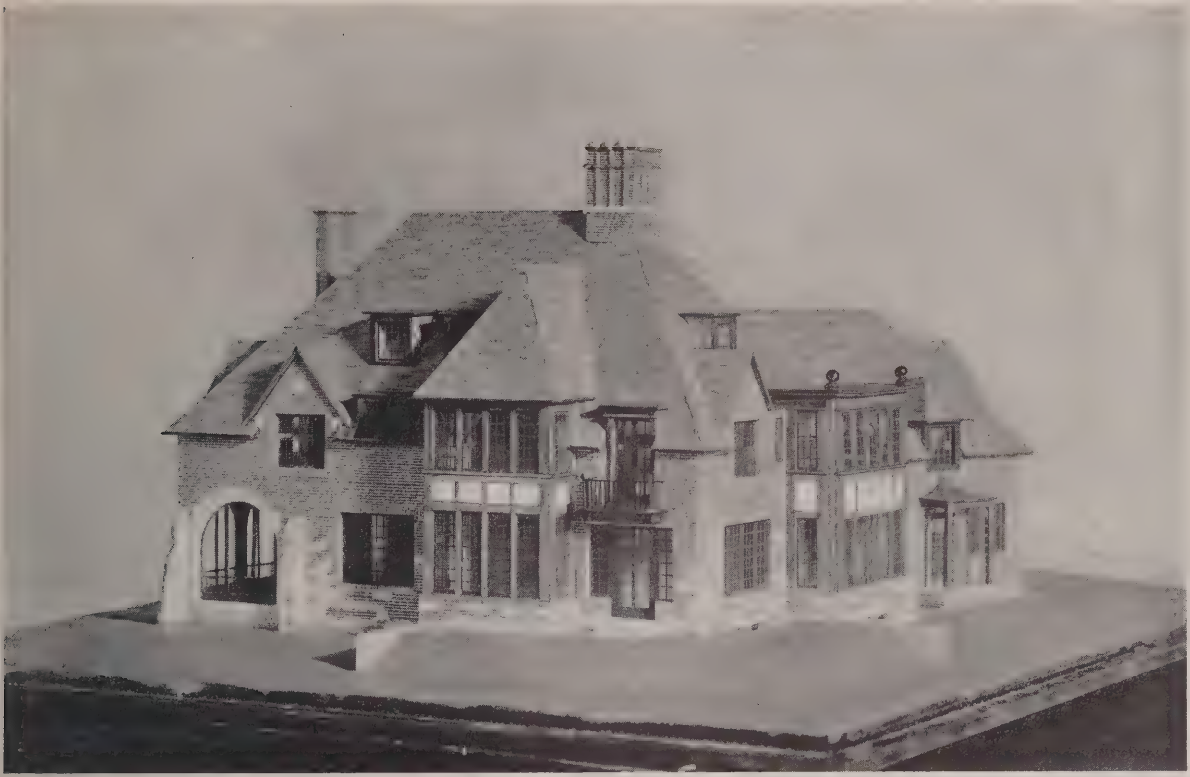
contends, for example, that a certain wall should be constructed with a batter while the other maintains that it should be perpendicular, by having a model to refer to, they may readily agree as to which is the better scheme.

It is, however, in discussions between architect and client that the model is most helpful. It offers a real means of communication between the two. The conventional portrayal of architectural designs is artificial and often ambiguous, and sometimes even deceitful, to the lay mind. Anyone can understand a model. If the building is for an individual and of a private nature, the personal tastes of the client are important, and a sketch model helps the architect and client to understand each other; it helps the architect to discover the client's preferences and personal prejudices, and it aids the client in appreciating the architect's creations. Erroneous conceptions are avoided. A model often more than saves its cost by making unnecessary costly alterations.

If the building is more or less of a public nature, where decisions had best be left to the architect, and the architect has committees or trustees to deal with, a more detailed and carefully finished model of what the architect deems the best solution will help to convince the various members and to get action. If some member of the building committee argues for an impractical or inferior scheme, a model readily demonstrates his error. How often, after working out a good design, the architect meets with delay and postponement! The writer knows of many instances where the architect gives the model full credit for getting the order to go ahead,—for "selling" the client.

Incidentally, in this connection, a model often serves another very valuable function in helping to arouse public interest in a project,—by being conspicuously exhibited, as, for example, in a case involving bond issues or a drive for funds. Subscribers like to see just how their money is going to be used. A few years ago in Cleveland, within a short space of time ,four prominent public money-raising drives took place. Of these four, two were for hospitals and two for colleges. In each of these pairs, one got the quota on schedule and one did not; but the two that did had scale models of the proposed buildings publicly exhibited, and the two that failed had no models. While this does not necessarily prove that the models were responsible for the outcome, these facts would indicate that a model has influence. In this way alone a model may earn its cost many times over.

When an elaborate project is being contemplated and planned, only a small portion of which is to be built in the immediate future, a model helps psychologically to fix the scheme and to insure its



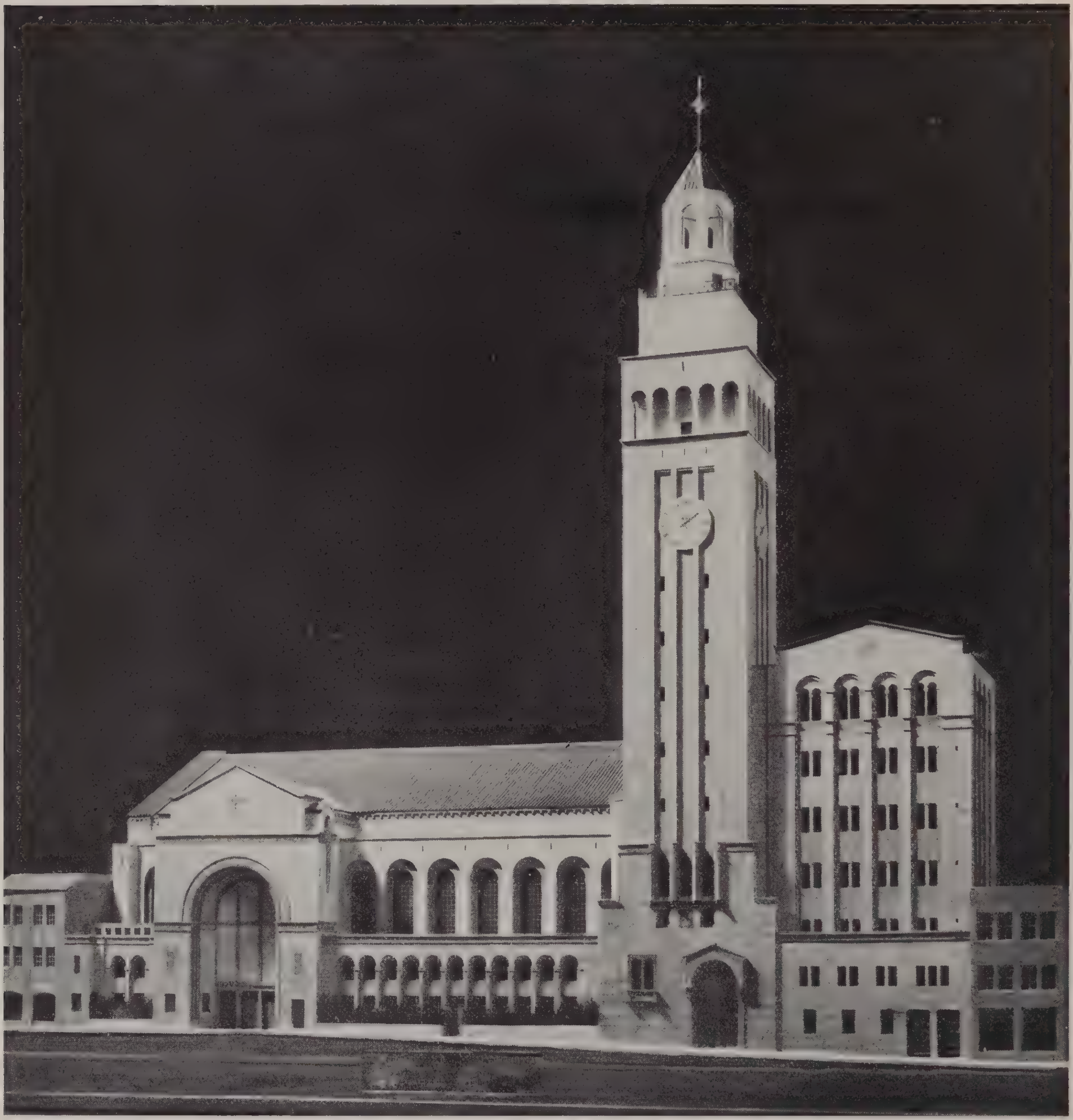
One-eighth Inch Scale Model of a Residence at Madison, Wis.
Law, Law & Potter, Architects

completion by keeping it in mind, making it less easy for something inferior to be substituted by a cheaper or less competent architect, or for a future administration to graft on. When it is planned to build only part of a group or building, leaving the rest to be completed at some future time, the model can be made with the future addition detachable, showing both the part to be immediately built and the finally completed project. To show two or more different designs for some particular feature, as a tower, the model can be made with interchangeable parts. Special features, such as an ornamental doorway, a cornice, or other like details, are best shown in detail on separate models, rather than by enlarging the scale of the model of the whole building sufficiently to portray them, which would result in needless duplication.

The interiors of auditoriums, churches, theaters, lobbies, and similar buildings, are effectively portrayed by models. The model should be constructed in sections, usually six, to correspond with the floor, four walls and ceiling, each section removable while leaving the other five intact, for the purpose of viewing. In this way the model can be viewed from all angles, and it affords a complete check on the seating arrangements. The interior and exterior can be shown in the same model, but it is usually more satisfactory and less expensive to make separate models. In buildings of a monumental nature, where time and expense are not important considerations, an additional model at a larger scale, showing more detail, made in conjunction with the preparation of the working drawings and specifications, is valuable. Sometimes an exact model of the plat and topography in their original condition is helpful to the architect in developing a layout, especially for a group of buildings.

In some cases it is practical to "sketch model" the various buildings and units separately, and to move them about in various positions on the plat, in order to try out different schemes. In this way all possible combinations are easily and quickly tried out and effectively studied, and the time and labor of drawing up the various schemes are saved. In portraying group plans, it requires a great many drawings and perspectives to show even a small portion of the many interesting views and vistas. The cost of preparing a few such drawings soon equals the cost of a model that would show all from every angle, doing so definitely and without error. A group plan or landscape model should be at a scale to keep its maximum width less than 4 feet. However, a large group plan model can be made in sections or developed by installments, first modeling the buildings individually, and later adding the landscaping and connecting sections.

Photographs of models are excellent for publication purposes. If surroundings and setting are important features, these can be drawn in either di-



One-eighth Inch Scale Model of a Preliminary Study for the Euclid Avenue Baptist Church, Cleveland

Walker & Weeks, Architects

rectly on an enlarged photograph of the model or on a tracing from it with much less labor than it would take to lay out a separate perspective. Cardboard models are light in weight, and are not nearly as fragile as those made of plaster or clay. They are easily carried about and are convenient to take to committee meetings. A collection of such models, having served as preliminary studies, would form an interesting and useful exhibit in the architect's reception room,—or they can be easily stored and filed for reference. The use of models is steadily increasing. Those architects and landscape architects who use them are enthusiastic over them, and it seems certain that the time is coming when presentation will be made largely by models.

STEEL FRAMING FOR A THEATER

BY

MILTON TUCKER

DRAWINGS BY CHARLES J. McGINLEY

IN the designing of steel framing for theaters, the most perplexing problems are usually found in the balconies, or more precisely, in the balcony trusses. For here it is that we have to deal with heavy loads, combined with long spans and limited depths. Intersecting trusses and cantilevering often add to the difficulties and require complicated connections seldom met with in other buildings.

The Mastbaum Theater, Philadelphia's newest and largest playhouse, is no exception to this rule. In fact, in very few theaters can trusses be found with the length and load, combined with the limited height, which confronted the engineers engaged on this work. The modern theater, of course, does not permit the use of any intermediate columns under the balcony. In the Mastbaum Theater, the two main balcony trusses were required to span 131 feet, center to center of the supporting wall columns. Although main balcony truss MT2 (Fig. 1) was allowed a depth of 23 feet, main balcony truss MT1 was limited to a depth of 15 feet, and at the same time it was required to carry a load of 1200 tons. As a result, the stresses developed in the various members ran very high. In addition, the three "vomitories," or passages from the balcony to the second promenade, pass through each truss. In the case of main truss MT1, the vomitories take up the entire panel opening; this precludes the use of any diagonal members in three panels, i.e., the center panel, and the second panel from each end. This difficulty was overcome by designing the top chords as plate girders to take the shear in the panels. These girders occur not only over the open panels, but over each adjoining panel. In the adjoining panels, part of the shear is carried by the web plates of these girders, and part by the diagonals.

Main truss MT1 was designed with double top and bottom chords and with a single-web system between the double-chord members, as can be seen in Fig. 2 which shows the uncompleted truss. The web members consist of rolled sections and cover plates, while the chord sections are a combination of angles, flange plates, and cover plates. Both top and bottom chords were double-laced throughout their entire length. All connections were designed with the rivets in double shear in order to cut down the number of rivets. All rivets used were 1 inch in diameter. Field holes were punched 15/16 inch in diameter and then reamed for 1-inch rivets after the truss was completely assembled in the shop. Of course the truss was disassembled again for transportation. The top and bottom chords were each shipped in three sections. Very little difficulty was experienced in driving the rivets in the field, due to the accurate punching in the shops of the fabricators, and the efficient field organization of the erectors. Fig. 3 shows a few of the 25,000 rivets used in this one truss (MT1); of these, 21,000 were driven in the shop and 4,000 in the field. The completed truss, of 173 tons, is shown in Figs. 3, 4 and 5, in which

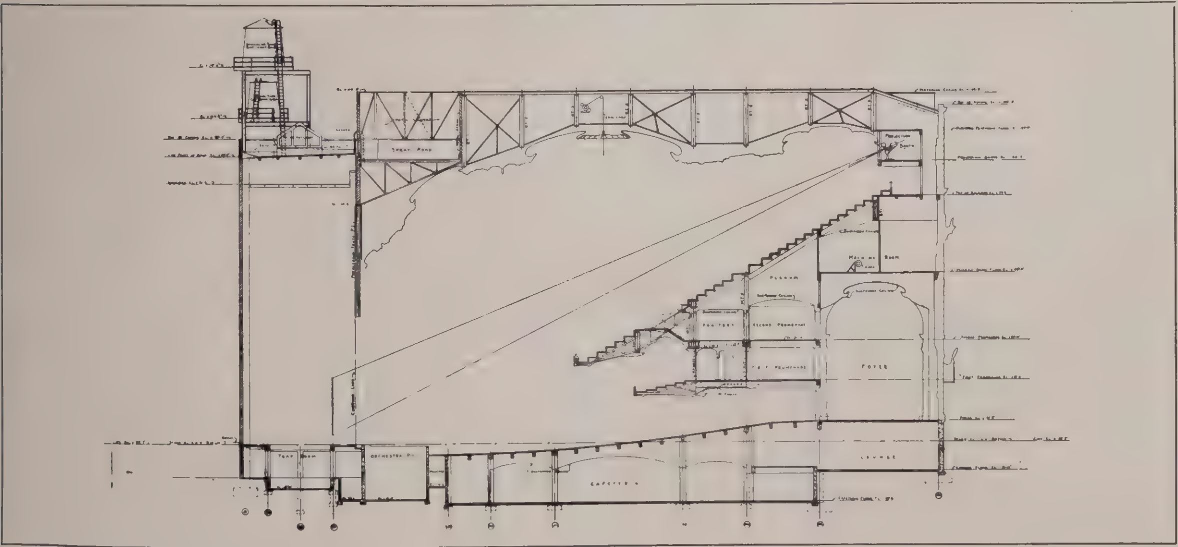


Fig. 1. Longitudinal Section, Mastbaum Theater, Philadelphia

Hoffman-Henon Company, Architects and Engineers

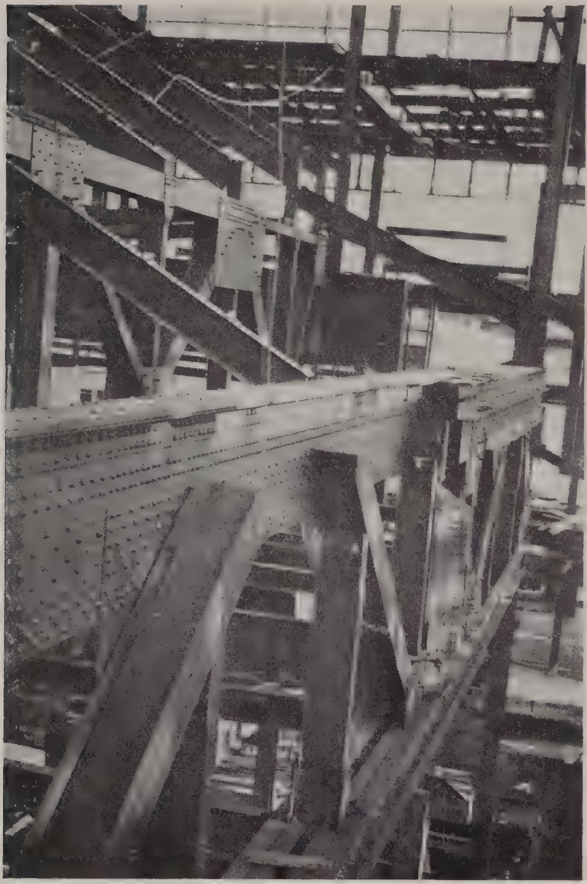


Fig. 2. Main Truss MT2, Twenty-three Feet Deep

are also shown the open panels for the vomitories.

In Figs. 6 and 7 is shown the layout of all the balcony trusses. In Fig. 7, the truss with the heavy top chord running to the wall column is main truss MT1. Back of it is main truss MT2, which offered very few obstacles owing to the greater depth available (23 feet); the resulting truss weighs 65 tons. Main truss MT2 is made up entirely of rolled sections and cover plates. A good idea of the comparative sizes and weights of the two main trusses can be obtained from Fig. 8. To support the front of the balcony required an additional truss, but due to the slope of the balcony, the available depth between the floor and the ceiling below becomes less and less as the front was approached. The design of MT1 presented difficulties enough, but the design of fulcrum truss FT1 offered even more. To make possible the use of a rational design it was necessary to cut down the length of truss FT1 to a practical figure. This was accomplished by introducing the diagonal girders DT1 and DT2 to cut off the corners and carry FT1. This at once simplified the designing of FT1.

The diagonal girders are supported at one end by the main balcony truss MT1 and at the other end by wall columns. Each girder weighs 30 tons. These diagonal girders were originally designed as trusses, but, due to the shallow depth obtainable and the high stresses in the web members, difficulty was experienced in developing the joints. This made necessary the plate girder design. As a matter of fact, many of the balcony trusses could have been designed as girders, i.e., with solid webs; but since the space between the balcony floor and the ceiling below is occupied by a plenum chamber in connection with the heating and venti-

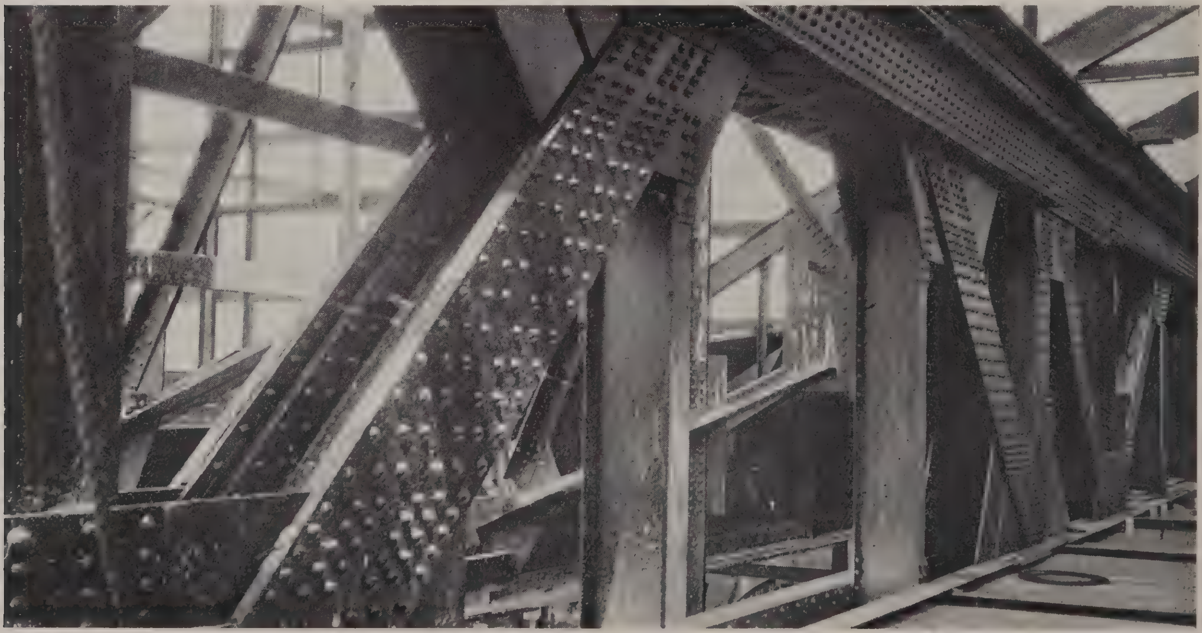


Fig. 3. Truss MT1, Fifteen Feet in Depth, Supporting 1,200 Tons

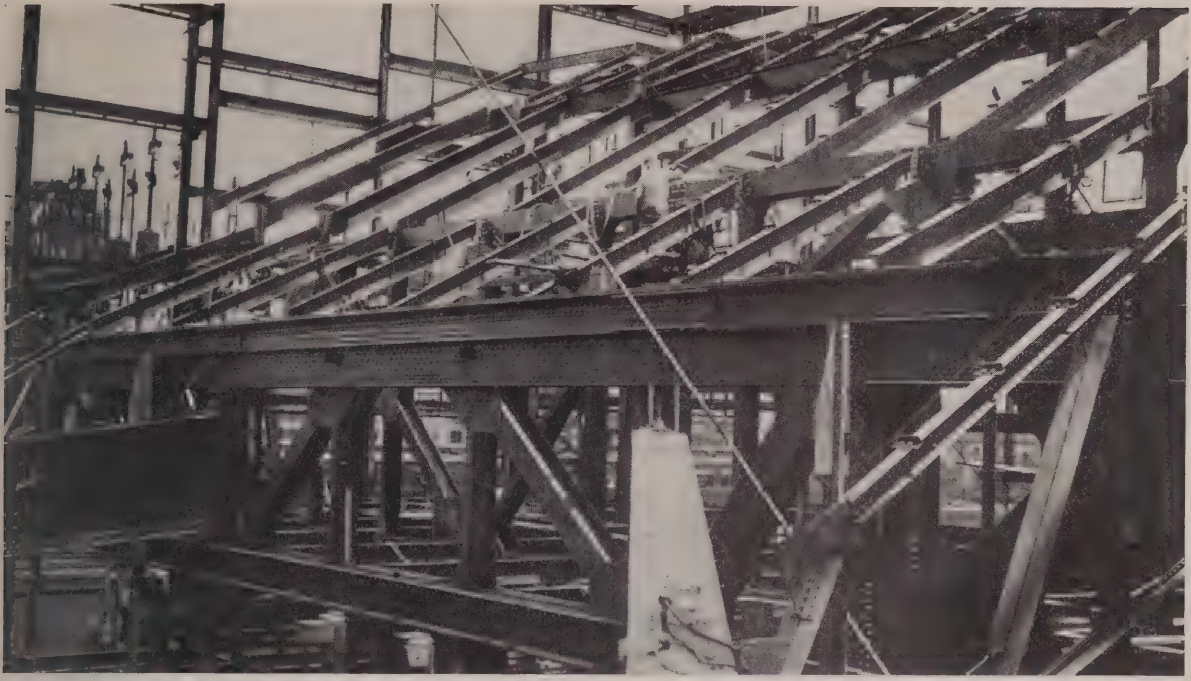


Fig. 4. Truss MTI, Showing Open Panels for "Vomitories"

lating, it was necessary to use trusses to permit the free passage of air to all portions of the plenum chamber. The fulcrum truss FT1 is 83 feet long, weighs 35 tons, and was brought to the site completely assembled. Figs. 6, 7 and 9 show the manner in which the diagonal girders carry the fulcrum truss.

The very front of the balcony is supported by ten cantilever trusses in the manner shown in Figs. 6, 7 and 9. These cantilever trusses are supported at the fulcrum point by the fulcrum truss FT1, and at the rear end they are anchored to the main balcony truss MT1. The balcony seats rest on reinforced concrete slabs, or "steppings." From the balcony fascia back to the main truss MT1 these steppings are carried on the cantilever trusses. The portion between the two main trusses is carried on rolled steel sections framed between the trusses. In back of MT2 is a line of columns coming up from the auditorium floor to the under side of the balcony. The steppings between these columns and MT2 are carried on rolled steel sections. Figs. 1, 6 and 7 show the supports for the concrete steppings. The top of the balcony between the line of columns and the rear wall is carried on three trusses, BT1,

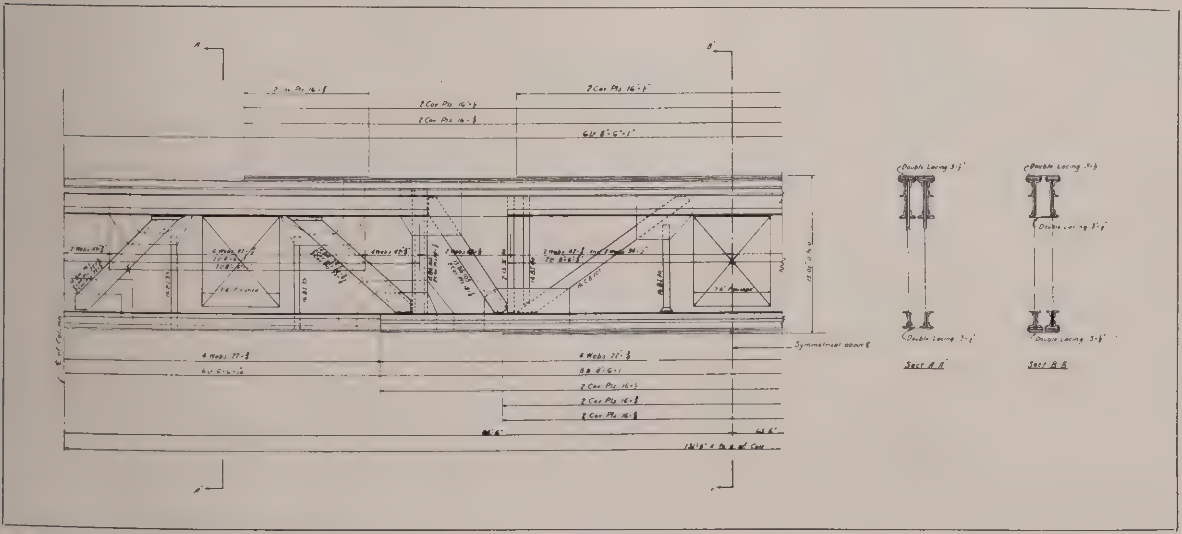


Fig. 5. Detail of Main Balcony Truss MT1

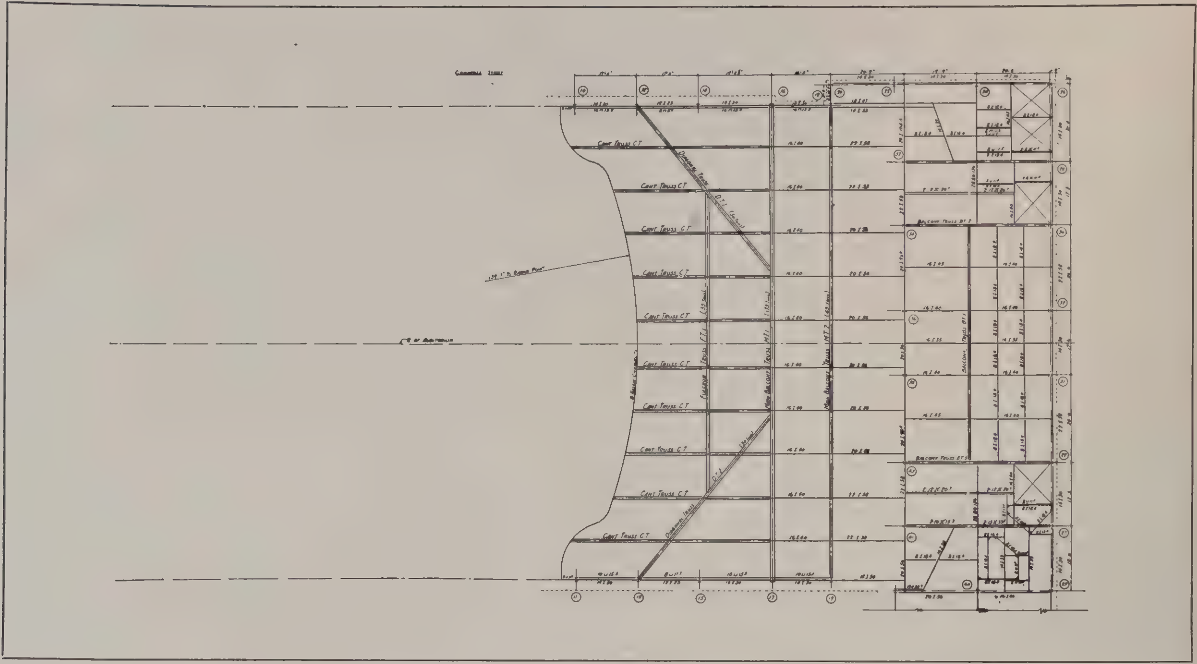


Fig. 6. Main Balcony Framing Plan, Mastbaum Theater, Philadelphia

2 and 3, and on rolled sections, as shown in Figs. 1 and 10.

As can be seen in Fig. 1, the lower or loggia balcony is slung under the upper balcony. The loggia balcony steppings are supported on cantilever trusses similar to the cantilever trusses in the upper balcony. These trusses are supported at the fulcrum point by hangers up to the main balcony truss MT1, each hanger consisting of two 6 x 4 x ½-inch angles. This accounts for some of the 1200-ton load figured for MT1. These hangers are concealed in imitation stone columns forming an ornamental arched colonnade. The rear ends of these cantilever trusses are anchored by struts up to the main balcony truss MT2. The rears of these cantilever trusses were made up as girders with solid webs on account of the shallow depth. However, in order to pass fresh air ducts from one side of the balcony to the other, it was necessary to burn six 10-inch diameter holes in the web of each girder. These cantilever trusses, with the holes in the webs, can be seen in Fig 7, if carefully observed.

The main roof slab is a poured-in-place gypsum slab, 3½ inches thick, of the suspension type. The slabs are carried on channel iron purlins which

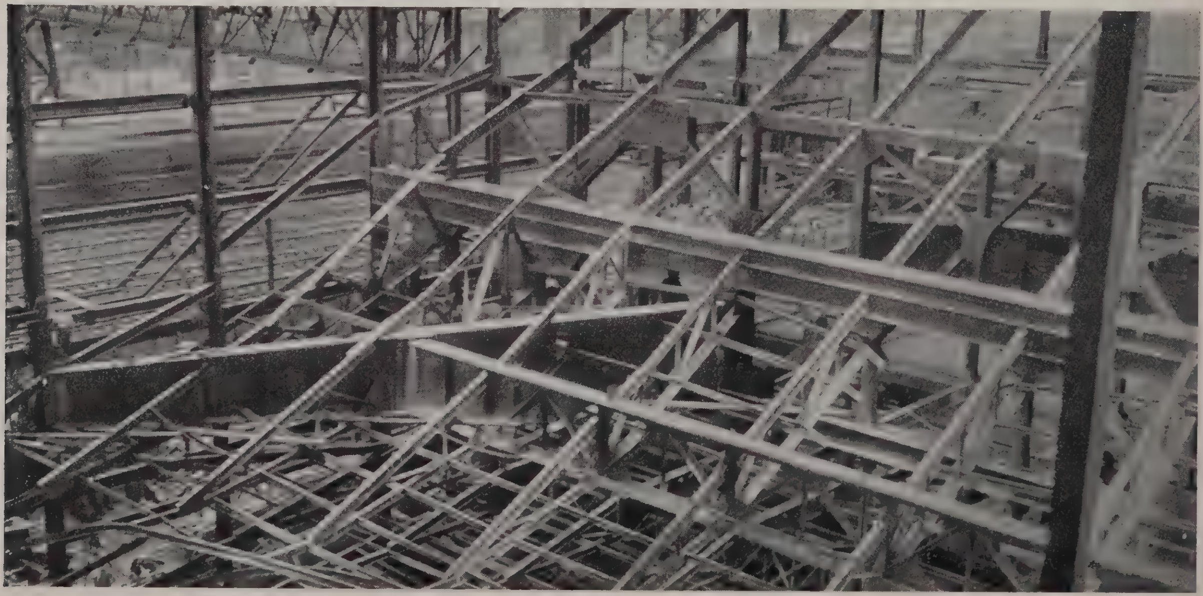


Fig. 7. Several of the Ten Cantilever Trusses Supporting the Front of the Balcony

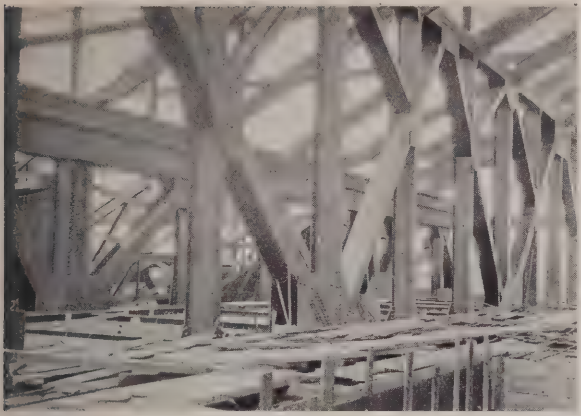


Fig. 8. Comparative Sizes, Trusses MT2 and MT1

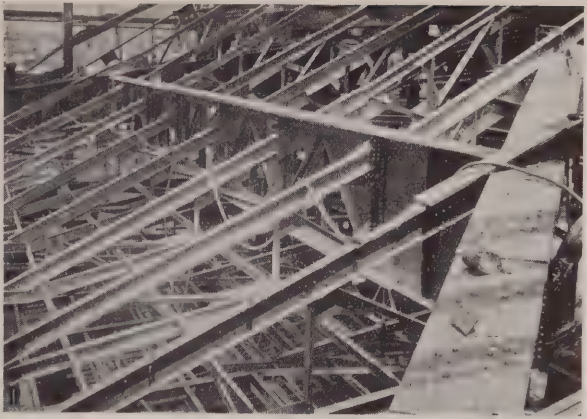


Fig. 9. Cantilever Trusses to Support Front Balcony

are supported by the roof trusses. The latter are of the Warren and Baltimore types, and vary in weight due to the varying loads carried. See Figs. 1 and 10. From the truss at the rear is hung one side of the projection booth and broadcasting room, with floor area of 138 feet by 21 feet, figured for a dead and live load of 225 pounds per square foot. The other side of the projection booth is supported on wall columns. This roof truss is 139 feet long, 13 feet deep, and weighs about 30 tons. The top of the truss is 113 feet above the auditorium floor. This truss was hoisted in two sections and shored up from the balcony as shown in Fig. 11. The other seven roof trusses were hoisted from the auditorium floor, fully assembled. The trusses over the domed ceiling carry the main chandelier. The latter was figured at 2 tons, but this is only a "drop in the bucket" as compared with the total loads on the roof trusses. Roof truss RT1 (over the orchestra pit) carries the spray pond for the cooling system, 35 feet by 106 feet in area. The main ceiling and the walkways over the ceiling, which provide access to the cove lighting and to the chandelier winches, are all hung from the roof trusses and the purlins. All the trusses are adequately braced at the top and bottom chords. In addition, there are three rows of cross frames for further strengthening.

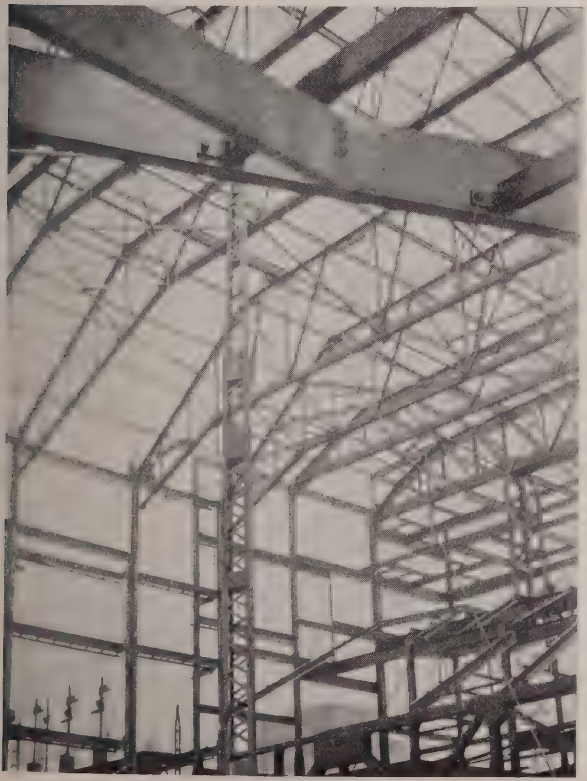


Fig. 10. View of Roof Trusses

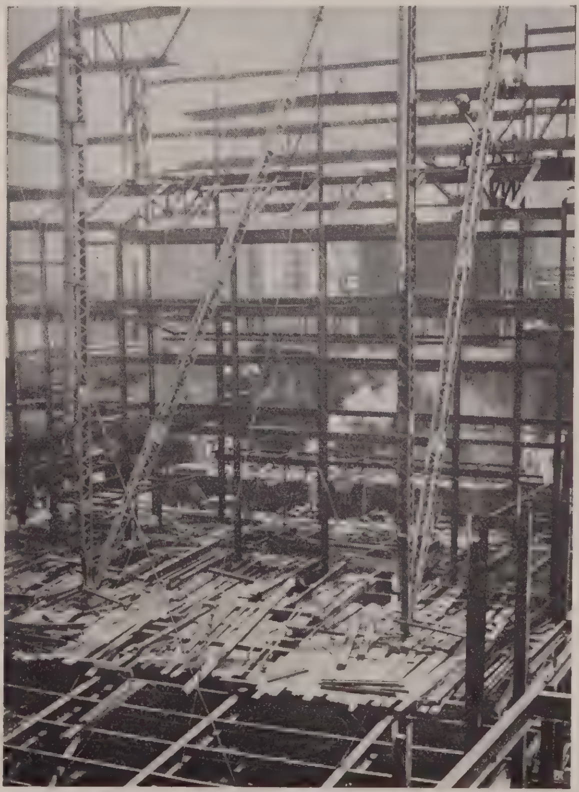


Fig. 11. Truss Being Placed

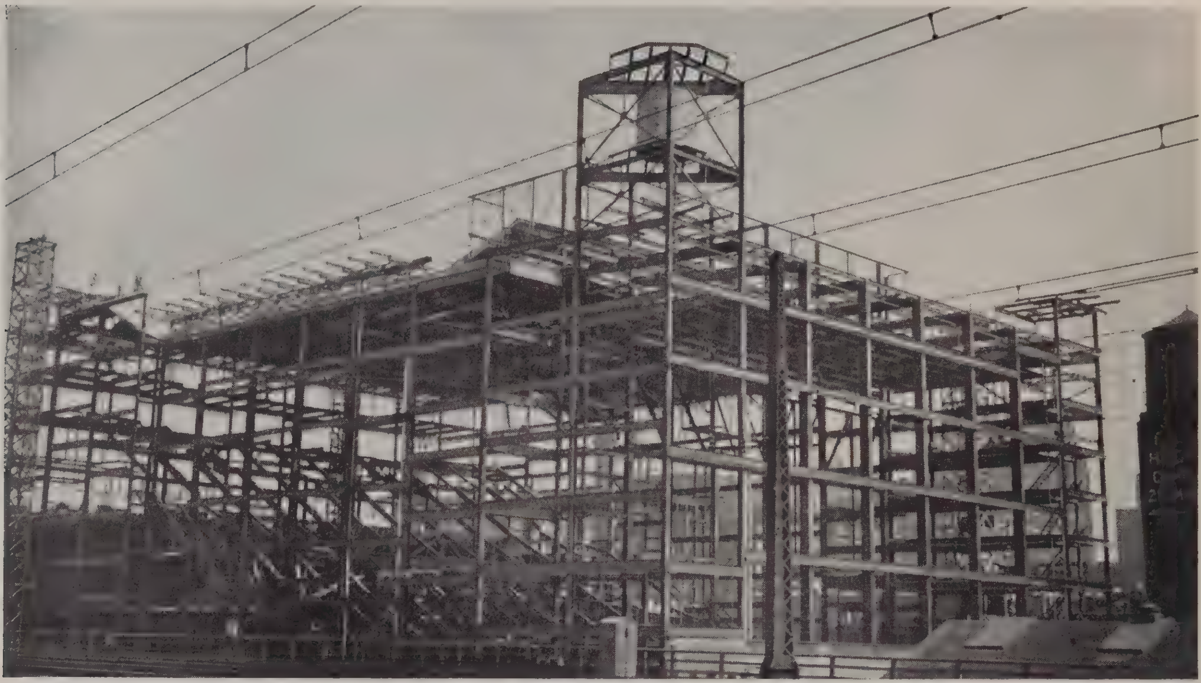


Fig. 12. General View of the Framing of the Mastbaum Theater, Philadelphia

Hoffman-Henon Company, Architects and Engineers

The proscenium wall over the proscenium arch, or stage opening, is carried on a truss made of angles. Due to the practically unlimited depth available, this truss is comparatively light, weighing only 30 tons. The width of the proscenium opening is 75 feet. In the back stage wall the columns are unsupported for a height of nearly 90 feet, due to the necessity of having a clear, open space to handle scenery. To take care of this condition and to keep the unsupported lengths of columns within the allowable stresses, as prescribed by the Philadelphia building code, these columns were made of 24-inch I-beams. In the other direction, the columns are tied into the spandrels, which occur at 14-foot intervals, by ⅜-inch plates. The masonry of the rear stage wall is 13 inches of brick, as required for a fire wall. Other walls above grade consist of 4 inches of brick and 8 inches of hollow tile. Walls below grade are reinforced concrete and are chiefly retaining walls.

The foundations are of reinforced concrete, of the spread type. Due to the head of water on the floor of the sub-basement, 28 feet below the sidewalk, a 12-inch thick hydrostatic slab was required. This, of course, was designed as an inverted floor slab. In general, the theater frame is of reinforced concrete and steel. The completed steel framework, totaling about 1800 tons, is shown in Fig. 12. Here the house tank is seen in position, and, over it, the platform for the sprinkler tank. In back of the tank appears the light framework for the spray pond louvers. Directly beneath this can be seen the proscenium truss over the stage opening. At the extreme right is the framing for the pent house for the dressing room elevator machinery. The dressing room section is literally an eight-story building, isolated from the rest of the theater by fire walls and automatic fire doors. Two elevators serving the balconies will be located in the far left corner near the temporary service elevator shown. In Fig. 12, the balcony steel can be seen, as well as the 24-inch columns in the rear stage wall. The steel pole in the foreground supports the wires of the Pennsylvania Railroad.

When finished, the theater will seat 4709, of which number 2387 seats are on the main floor, 433 in the loggia balcony, and 1889 in the main balcony. The structural designing was done under the supervision of John E. Williams, the engineer of the Hoffman-Henon Company, Philadelphia.

PROVIDING FOR RADIO AND AMPLIFYING INSTALLATIONS IN LARGE BUILDINGS

BY

KARR PARKER

CONSULTING ENGINEER

THE tremendous growth of radio broadcasting during the past few years and the almost universal public demand for this service have brought a new problem to architects. What provision should be made in the construction of clubs, hotels, hospitals, apartment houses, schools, auditoriums, etc., for radio installations? Closely allied to the radio installation is the voice-amplifying or "public address" installation. Auditoriums and hotel dining rooms have been increased in size until the voice of a speaker cannot be heard distinctly throughout the rooms and must be amplified by means of microphones and suitable reproducers. If proper provision is not made for conduit and wiring when the building is built, it is difficult to make a satisfactory installation later and to get the microphone and reproducer outlets in the correct locations. Furthermore, it is expensive and unsatisfactory to channel finished surfaces for conduits and to patch and refinish walls and floors. Large public buildings should have provision made for radio and voice-amplifying systems, and the conduits and outlet boxes, etc., should be built in with the building.

Certain general rules will apply to a central radio installation for a large apartment building, club, hotel or hospital. In this type of installation one or more programs are received in the radio control room and supplied to the guests or tenants over a wiring system. Usually the equipment operates from noon until midnight, and the guest can switch his loud speaker or head set off and on or select his program as desired. There is no receiving or amplifying apparatus in the guest room, and therefore no skill or attention on his part is required. The programs being received on a high class equipment by a skilled operator in the control room can be transmitted to 2,000 rooms and give radio reception that is far superior to that which the average user would get from his own radio set. In large, high buildings it is practically impossible to get satisfactory radio reception by individual sets in the rooms, due to the absorption of the ether waves by the steel frames of the buildings. There is an increasing tendency for the landlord to supply radio service to his guests by a central system in the same way that heat and light are supplied.

The design of a central radio system starts with the location of the radio control room. This should be on the roof or top floor of the structure unless there is also a broadcasting station on the building. In the latter case, it should be located as far from the antenna of the station as possible, but not lower than the third story of the building. If public address equipment is also to

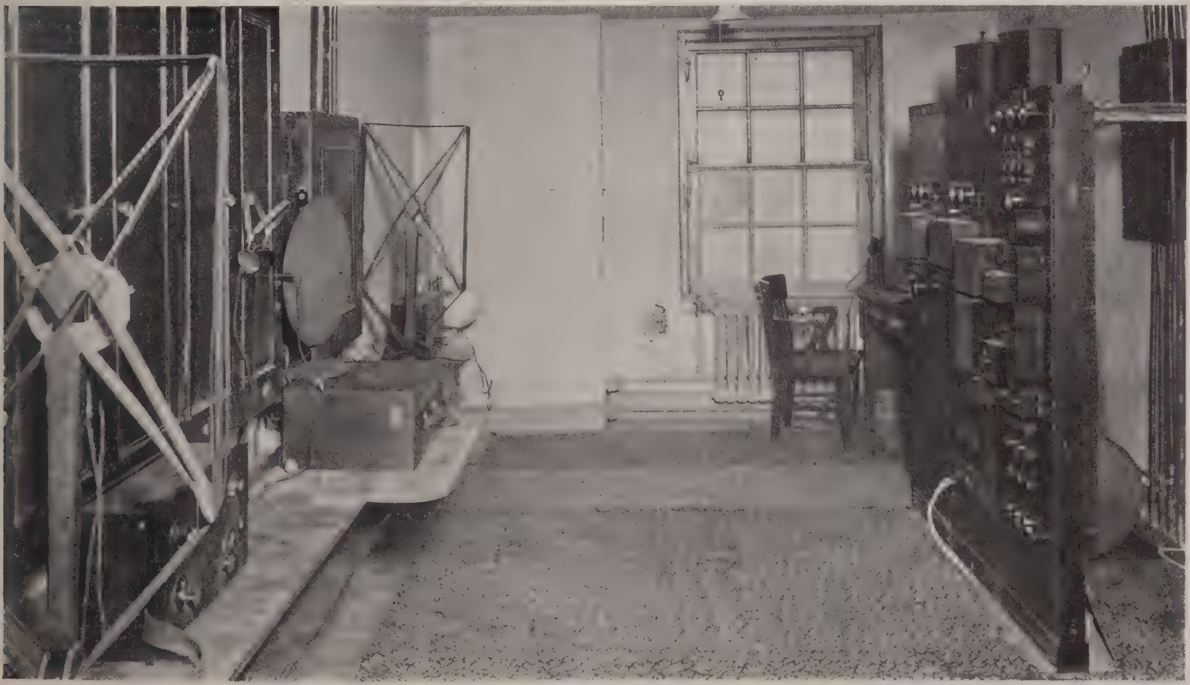


Fig. 1. Radio Control Room for a Large Installation

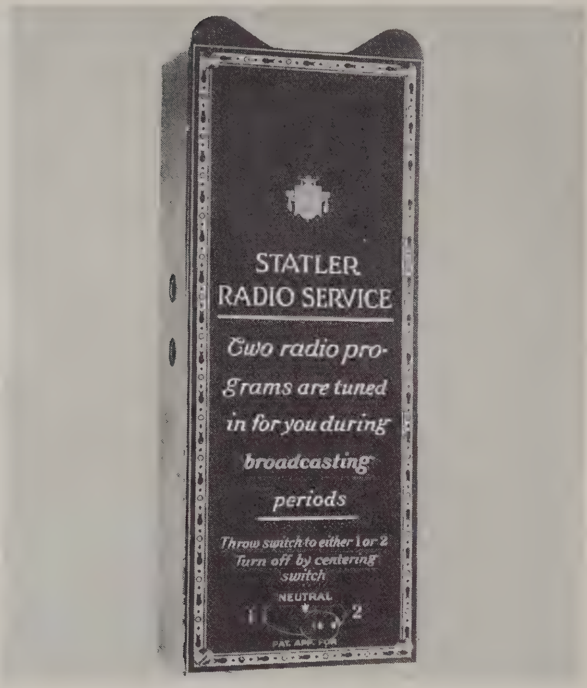

STATLER
RADIO SERVICE
Two radio programs are tuned in for you during broadcasting periods
Throw switch to either 1 or 2
Turn off by centering switch
NEUTRAL
1
2
PAT. APP. FOR

Fig. 2. A Lever Type Selector

be used, the room should be approximately 15 by 20 feet in size; if radio equipment only, it may be reduced in size to 10 by 10 feet. It is advisable to provide sufficient room for the equipment and operator. Figs. 1 and 5 show well arranged radio control rooms for a large radio and public address system. The architect should consult with the owner and determine whether the system shall carry one program only or shall distribute two or more programs. A pair of wires are required to every outlet in the building for each channel,—i.e., a three-channel service would require six wires to each outlet. The cost of installation increases greatly with additional channels, and also it is much more difficult to install the wiring for multiple systems because of inductive interference between the circuits which causes "cross talk" and a poor quality of reception.

The next thing to be determined is whether loud speakers or head sets or a combination of the two are to be used in the various rooms throughout the building. If it is a hospital, head sets located at the heads of the patients' beds are recommended because of the necessity for quiet. In an expensive apartment building, however, loud speakers with proper volume control will probably be desired. However, caution must be exercised in installing loud speakers in a large hotel or apartment building, especially around inside courts, as the collective noise of a large number operating at one time is objectionable. A study of each particular case and its acoustics should be made to avoid such a difficulty. A good general rule is to use loud speakers on large outside rooms and suites and to install head sets in the smaller inside rooms. Fig. 6 shows a radio head set installation suitable for hospitals or hotels.

From the terminal cabinet in the radio control room a complete conduit system must be run to the various outlets. Not more than 50 head sets or 15 loud speakers should be placed on one branch circuit, and the wiring for head sets and loud speakers must be run in separate conduits, as the current level is different for the two. These branch circuits should terminate on individual switches in the control room cabinet so that in case of trouble on any branch it can be quickly cut off and repaired without shutting down the entire system. The conduits are run in the concrete slabs, ending in steel outlet boxes in a manner similar to that of the lighting instal-

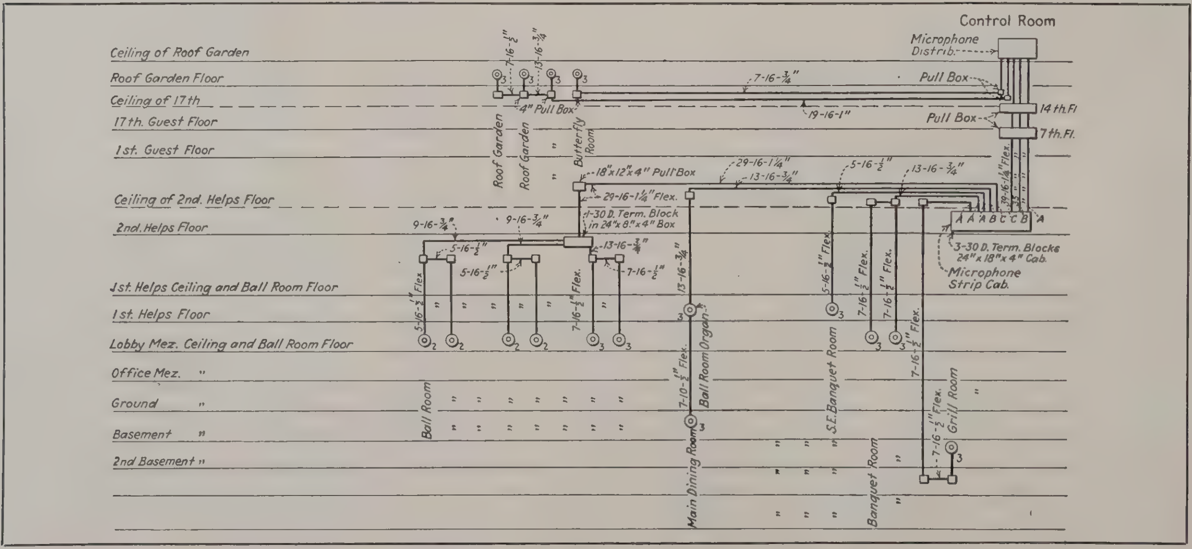


Fig. 3. Diagram of the Radio Wiring for a Large Hotel

lation. The wiring should be lead-sheathed in the control room; the entire system should be lead-sheathed, and each individual pair twisted on itself to minimize inductive interference if there is more than one channel. Special attention should be paid to the insulation of the cables. At the loud speaker outlets a plug-in receptacle (single or multiple type) with a small volume control dial may be provided with plate finished to match the hardware of the room. The guest selects different channels by simply plugging into the different holes in the receptacle. Special radio program selectors have been devised which may be built into the loud speakers or arranged for controlling head sets. Fig. 2 illustrates a lever type selector.

The receiving apparatus should be selective and made to "tune" sharply and should be of the heterodyne or radio frequency type with amplifiers of adequate capacity. The selection of the radio receiving apparatus, amplifiers and control room equipment calls for the technical advice of a radio engineer, and each installation should be worked out by a competent engineer. The head sets and loud speakers should be of the proper electrical characteristics to operate on the equipment selected. The arrangement of antenna and control room apparatus should be carefully planned in order to secure satisfactory operation. It is recommended that a magnetic reproducer be installed with a supply of phonograph records so that music can be supplied at all times independently of the radio reception.

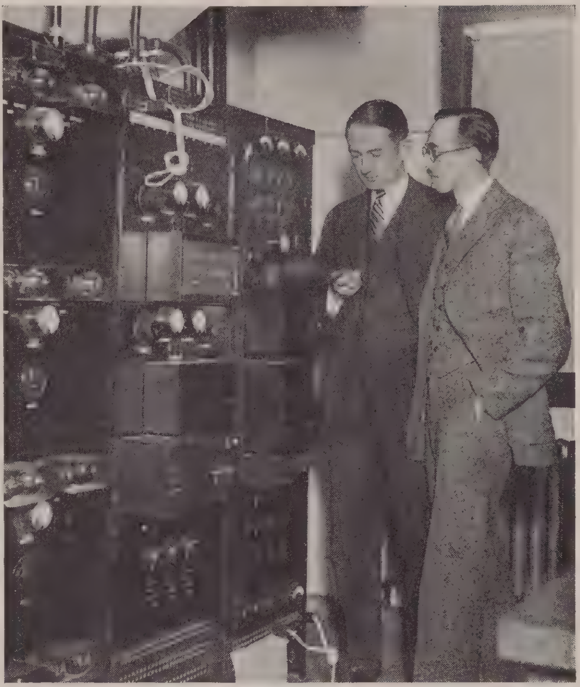


Fig. 4. A Panel Board of a Large Installation

The radio system may be combined with a voice-amplifying installation so that radio music, addresses and programs may be amplified and heard throughout large dining rooms, auditoriums and school rooms. Such an arrangement also permits of transmitting the voice of a speaker in the building over the central radio system simultaneously with the amplification of his voice in the auditorium. In a hotel, for example, an address by the President of the United States could be brought in over the radio from a distant city and amplified so that it could be heard at a banquet in the dining room at the time that it was transmitted throughout the hotel over the central radio system. Speeches at conventions and functions held in the hotel could be transmitted throughout the house so that guests in the rooms could listen to the speakers and to the orchestras playing in the hotel. This is also used in schools.

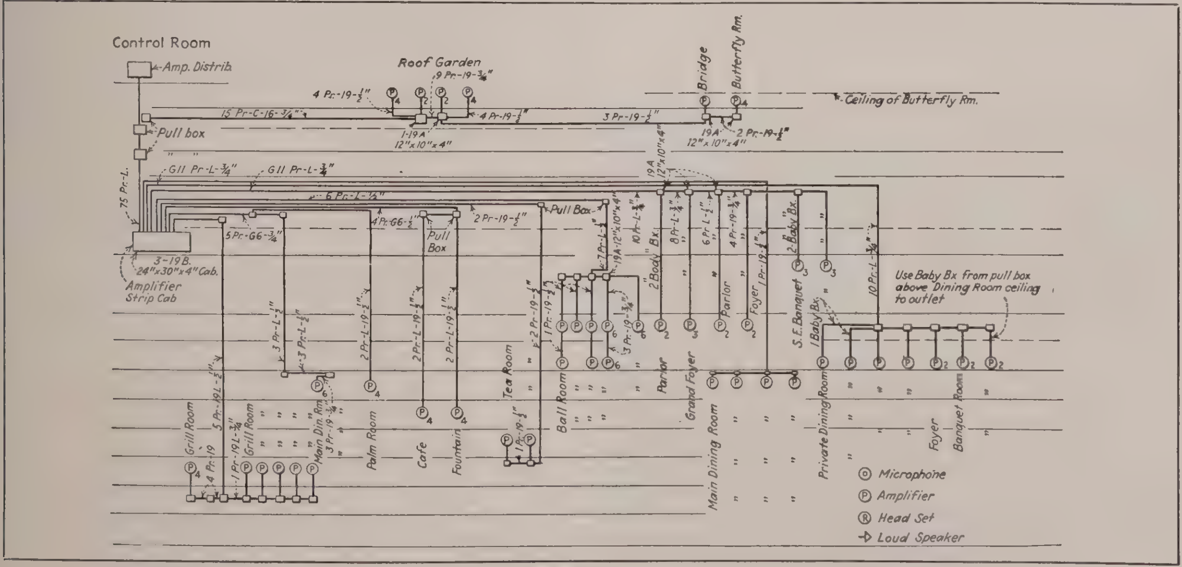


Fig. 3a. Continuation of Radio Wiring Diagram

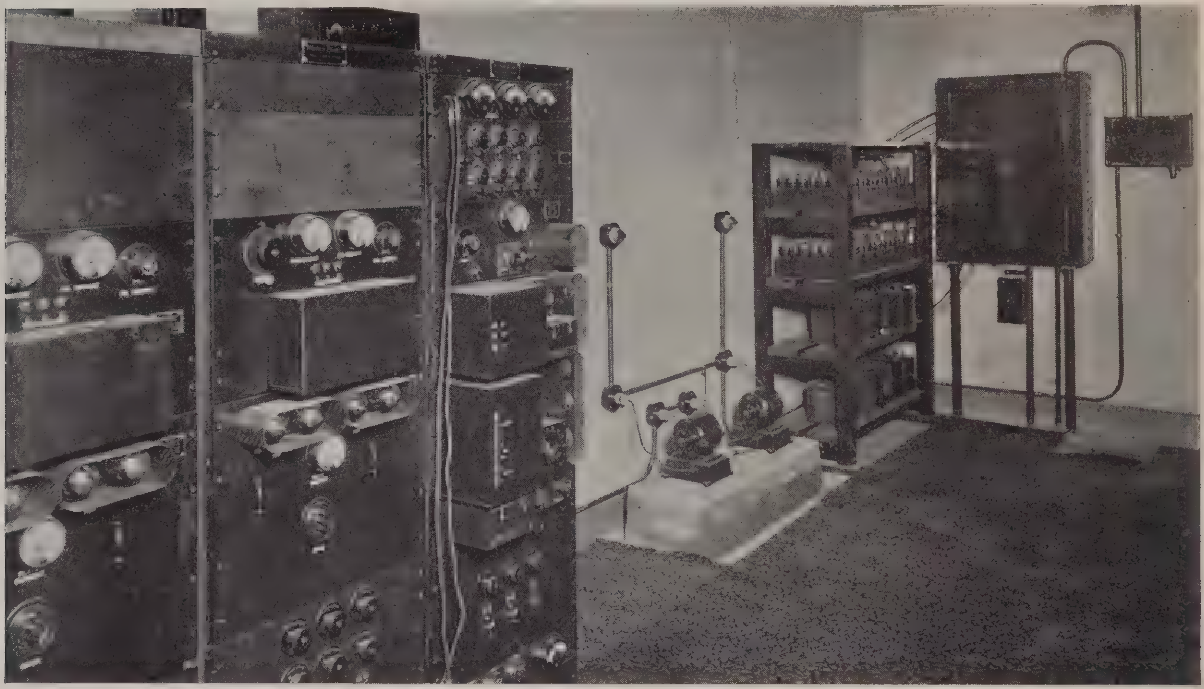


Fig. 5. Portion of a Radio Control Room Showing Panel Board

In designing the voice-amplifying system, microphone outlets should be provided in the dining rooms and auditoriums near the speakers' tables. For large rooms the horn type reproducer suspended above and in front of the table or stage should be used, grouping several horns if necessary so that the volume distribution is adequate. These reproducers should not be placed back of the microphone, or a "feed back" will result, with unsatisfactory operation. A large public address system control switchboard is shown in Fig. 4, and the wiring diagram of a large system is illustrated in Figs. 3 and 3a. In smaller rooms a cone type loud speaker or a horn type reproducer with a wider distribution than the conical horn type should be used. Conduit and wiring are run to the reproducer locations and terminated in receptacles into which the horns may be plugged.

Fig. 6. A Room Head Set in Use

In the radio control room a monitor speaker enables the operator to hear the speaker, and he can regulate the volume of amplification by means of his rheostats on the switchboard. The systems operate on 60-cycle, alternating current; if direct current only is available, small rotary converters must be installed to provide the alternating current. The cost of current for operating this equipment is negligible. At a rate of 2 cents per kilowatt hour, a large central radio system combined with a voice-amplifying installation can be operated 12 hours per day for a cost of 15 cents per day for electricity.

The general considerations applying to an installation as outlined here will aid an architect in determining the type of a central radio system that is desired for a particular building. The electrical design of the wiring system, selection of the apparatus and preparation of plans and specifications for the installation require the technical skill of a radio engineer who must work out each installation in order to get the proper results. Obviously, a poorly planned installation which is continually breaking down, giving faulty reproduction of speeches and music, would be a liability. If the system is properly designed, installed and operated, however, the maintenance cost is very low, repairs and current cost nominal, and service extremely dependable. There are large systems which have been operated for more than a year with efficient and practically uninterrupted service.

WILL ARCHITECTS BE BUSY IN 1929?

BY
C. STANLEY TAYLOR

EIGHTH ANNUAL BUILDING SURVEY AND FORECAST

THE prediction of The Architectural Forum, based on its annual survey and forecast which has just been completed, is that architects will be as busy, if not busier, in 1929 than in any preceding year. If any belief still persists that the record building activity in 1926 and 1927 represented a "boom period," it must be dispelled by the fact that the year 1928 shows a record of even a greater amount of construction than ever.

The theory was advanced by The Architectural Forum in January, 1928 that we had been experiencing a boom period in building activity, but that we had arrived at a relatively stable demand of new construction to meet the present-day needs of our growing population and expanded industrial and commercial life. In other words, the theory was advanced that we had practically arrived at a new normal annual volume of new building construction, from which deviations might occur only in direct accordance with the variations in general prosperity and business activity. The building figures of the year 1928, as shown in the accompanying charts, and in the totals produced by the various contract-reporting agencies, verify this theoretical conception. The reports of S. W. Straus & Company, covering permits issued and plans filed in 587 leading cities and towns throughout the country during the first eleven months of 1928, give a total value of $3,548,668,073, which is within approximately one million dollars of the total for the corresponding period of 1927. For the same period of eleven months, the F. W. Dodge Corporation reports building contracts in 37 states amounting to $6,195,529,800, which is slightly more than 6 per cent greater than the amount reported for the corresponding period of 1927 and that of the record-breaking year of 1926.

An additional and convincing proof of the theory of a new normal condition is presented in the accompanying forecast of The Architectural Forum for the year 1929. Architects throughout the country are familiar with the annual forecast which The Architectural Forum has presented for eight consecutive years, during which time it has arrived at a reasonably close approximation of the building activity which actu-

1929 PREDICTION BY DISTRICTS IN 19 BUILDING CLASSIFICATIONS

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U. S. A.
Automotive	$14,469,400	$42,132,200	$7,447,000	$10,670,000	$56,322,200	$14,539,800	$145,580,600
Banks	15,730,000	53,312,600	1,148,400	5,984,000	56,999,800	12,859,000	146,033,800
Apartments	16,801,400	366,163,600	10,469,800	20,882,400	171,941,000	84,992,600	671,250,800
Apartment Hotels	2,640,000	83,560,400	4,972,000	15,554,000	97,979,200	41,925,400	246,631,000
Club, Fraternal, etc.	7,231,400	70,010,600	1,515,800	13,191,200	66,704,000	15,987,400	174,640,400
Community and Memorial	3,421,000	21,232,200	1,529,000	5,711,200	17,047,800	11,710,600	60,651,800
Churches	21,142,000	55,105,600	22,770,000	23,859,000	69,885,200	20,409,400	213,171,200
Dwellings (Below $20,000)	10,936,200	83,540,600	6,791,400	11,215,600	40,198,400	24,314,400	176,996,600
Dwellings ($20,000 to $50,000)	10,346,600	38,445,000	5,935,600	7,629,600	37,470,400	15,085,400	114,912,600
Dwellings (Over $50,000)	6,749,600	43,443,400	5,555,000	5,662,800	25,348,400	12,837,000	99,596,200
Hotels	21,659,000	95,763,800	14,212,000	45,513,600	101,378,200	66,149,600	344,676,200
Hospitals	18,860,600	110,105,600	4,606,800	12,749,000	73,035,600	33,169,400	252,527,000
Industrial	20,295,000	130,191,600	15,661,800	35,846,800	154,671,000	28,789,200	385,455,400
Office Buildings	12,485,000	244,101,000	4,859,800	41,296,200	300,979,800	87,760,200	691,482,000
Public Buildings	15,518,800	185,924,200	6,226,000	18,499,800	87,353,200	27,689,200	341,211,200
Schools	44,811,800	165,499,400	13,010,800	60,152,400	256,326,400	57,981,000	597,781,800
Stores	6,366,800	78,876,600	4,477,000	7,926,600	55,497,200	23,324,400	176,468,600
Theaters (All Types)	6,303,000	62,891,400	3,746,600	7,812,200	74,032,200	8,773,600	163,559,000
Welfare Y. M. C. A., etc	10,799,800	48,100.800	5,077,600	13,666,400	31,858.200	4,644,200	114,147,000
TOTAL VALUE OF NEW BUILDINGS	$266,567,400	$1,978,400,600	$140,012,400	$363,822,800	$1,775,028,200	$592,941,800	$5,116,773,200

New Construction Under Architect's Supervision..$5,116,773,200

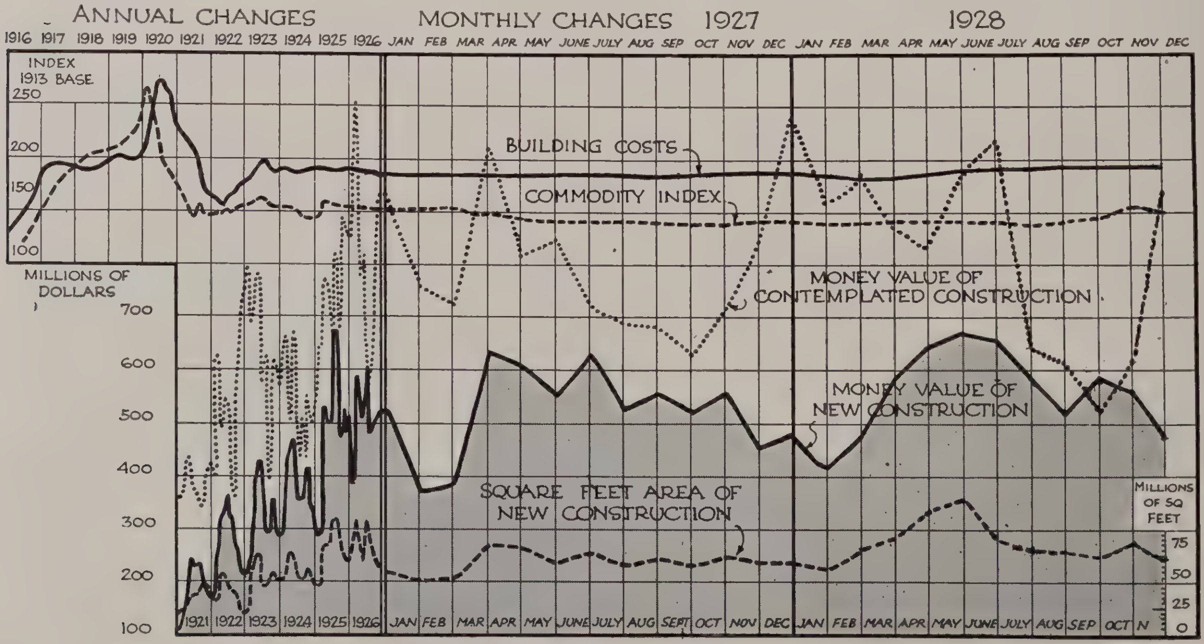
Buildings of All Types—Excluding Public Works and Utilities—Not Designed by Architects..... 2,192,020,000
(Estimated from Averages of Previous Years)

TOTAL ESTIMATED CONSTRUCTION FOR 1929.................................... $7,308,793,200
(Exclusive of Public Works and Utilities)

ally occurred. The forecast is based on individual reports received from architects in every part of the country, and the figures are developed by the use of a series of weighting factors which have been established after very careful research and which have proved to be substantially correct, insofar as anyone can forecast trends of the future. The present forecast for the year 1929 is based primarily upon reports received from 2,057 architectural offices, indicating work actually on the boards or in definite contemplation for contract letting during this year. The figures have been correlated and established in exactly the same manner which has proved successful for the seven preceding years, and for this reason it is felt that the law of average functions in these figures to a point which, unless some extraordinary occurrence takes place, will show that the figures given here for the year 1929 will be closely approximated in actuality. We predict, therefore, that building activity during the year 1929 will be maintained on approximately the same general level which has been established during the last three years, with a definite possibility of the total's exceeding any previous year's. There are definite changes in the relative activity in different types of buildings and there are changes in territorial activity, all of which are indicated in the accompanying tables and relative percentages.

In considering probable building activity it is, of course, necessary to give serious consideration to the general economic condition of the country. It is believed that we are entering a period of at least eight years of unprecedented prosperity. There are no threatening factors. There is no condition of over-expansion. There is a new administration in governmental affairs, which promises an even greater appreciation and understanding of the economic problems of the building industry than was ever before accorded. There has been established in the financial world a more direct relationship with the public, and consequently the sources from which money must be obtained for building projects are more powerful and more diversified than ever before. These coming years of prosperity will see another great development in the standards of housing for all types of commercial, industrial and domestic activity. Threads of transportation are drawing cities, suburbs and rural areas more closely together. There is a broader interchange of knowledge, and there is every reason to believe that higher standards and more rigid requirements will call for a volume of building which will maintain a new normal.

We are learning more about building activity in this country. The means for gathering figures are constantly being improved, and as a result, we are gradually realizing that our measuring of building activity has been inadequate in the past, and that in actuality we are building well over eight billion dollars' worth of new structures annually, to which may be added repair and replacement bills to bring the total closer to ten billion dollars, making the building industry by far the greatest of the basic industries of this country. This is the day of the architect in a manner never before known. He is constantly becoming more important in the economic structure, because he is

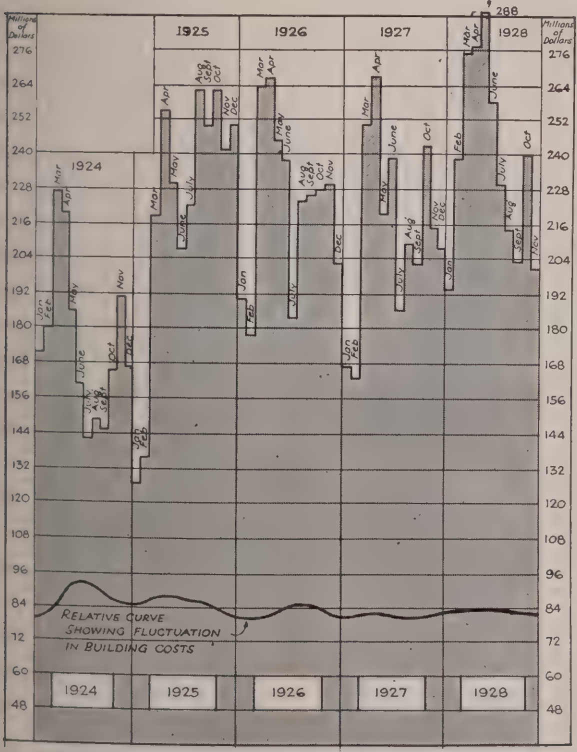


THE BUILDING SITUATION

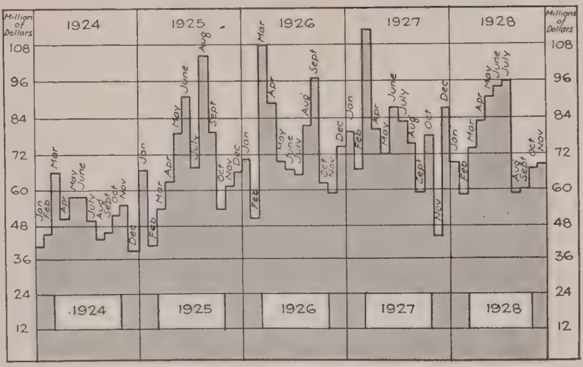
The various index lines are designated on the chart, which is developed from reports of the United States Department of Commerce, the F. W. Dodge Corporation, and *The Engineering News-Record* accepting the responsibilities of planning efficiently and of creating structures which are economically sound and successful as investment projects, as well as interpreting æsthetic features. The application of architectural precedents, as indicated by the work of contemporary American designers, comes closer to original conception than in any period known since these very precedents were established. Architects may, therefore, look forward with confidence to a busy year, a year which should be prosperous perhaps in a manner never known before by the architectural profession.

NATIONAL PERCENTAGES, U. S. A.

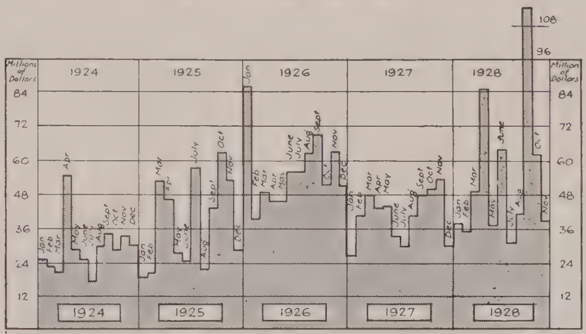
Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	3.9	2.8	—1.1
Banks	2.8	2.9	+ .1
Apartments	13.2	13.1	— .1
Apartment Hotels	4.4	4.8	+ .4
Clubs, Fraternal, etc.	3.5	3.4	— .1
Community, Memorial	1.5	1.2	— .3
Churches	4.3	4.2	— .1
Dwellings (under $20,000)	4.0	3.6	— .4
Dwellings ($20,000 to $50,000)	3.3	2.3	—1.0
Dwellings (over $50,000)	2.4	1.9	— .5
Hotels	6.9	6.7	— .2
Hospitals	6.2	4.9	—1.3
Industrial	5.3	7.5	+2.2
Office Buildings	11.8	13.5	+1.7
Public Buildings	6.7	6.7	—
Schools	11.5	11.7	+ .2
Stores	2.9	3.4	+ .5
Theaters	3.3	3.2	— .1
Welfare, Y.M.C.A., etc.	2.1	2.2	+ .1



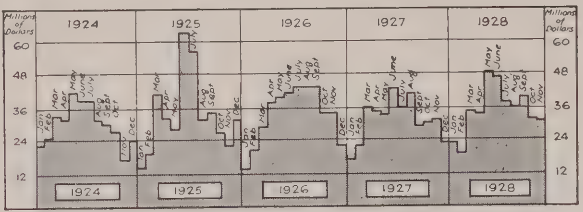
Residential Buildings



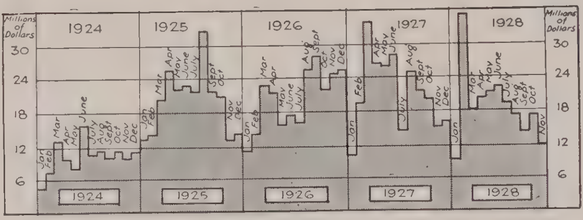
Commercial Buildings



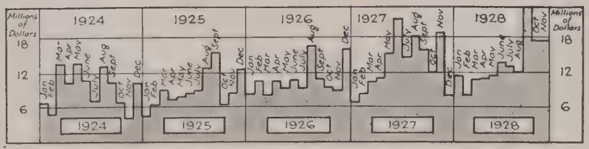
Industrial Buildings



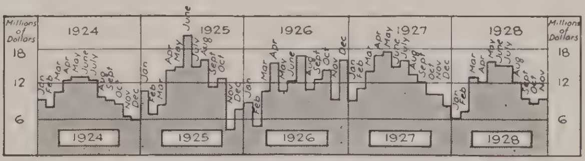
School and College Buildings



Club and Fraternal Buildings



Hospitals and Institutions



Church Buildings

CHARTS SHOWING VALUE OF NEW CONSTRUCTION FOR PAST FIVE YEARS

NORTH ATLANTIC STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	3.9	2.1	—1.8
Banks	4.2	2.7	—1.5
Apartments	20.0	18.5	—1.5
Apartment Hotels	.2	1.0	+ .8
Clubs, Fraternal, etc.	2.6	3.5	+ .9
Community, Memorial	.8	1.1	+ .3
Churches	2.9	2.8	— .1
Dwelling (under $20,000)	4.4	4.2	— .2
Dwellings ($20,000 to $50,000)	4.0	2.0	+2.0
Dwellings (over $50,000)	2.6	2.2	— .4
Hotels	6.2	4.8	—1.4
Hospitals	6.0	5.6	— .4
Industrial	4.6	6.6	+2.0
Office Buildings	8.0	12.3	+4.3
Public Buildings	7.1	9.4	+2.3
Schools	11.4	8.4	—3.0
Stores	3.1	4.0	+ .9
Theaters	2.5	3.2	+ .7
Welfare, Y.M.C.A., etc.	2.4	2.4	—

SOUTHWESTERN STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	4.8	2.9	—1.9
Banks	2.8	1.6	—1.2
Apartments	6.2	5.7	— .5
Apartment Hotels	3.6	4.3	+ .7
Clubs, Fraternal, etc.	4.1	3.6	— .5
Community, Memorial	1.5	1.6	+ .1
Churches	5.8	6.6	+ .8
Dwellings (under $20,000)	4.5	3.1	—1.4
Dwellings ($20,000 to $50,000)	3.4	2.1	—1.3
Dwellings (over $50,000)	3.1	1.6	—1.5
Hotels	12.5	12.5	—
Hospitals	5.9	3.5	—2.4
Industrial	3.4	9.8	+6.4
Office Buildings	15.9	11.4	—4.5
Public Buildings	4.9	5.1	+ .2
Schools	12.8	16.5	+3.7
Stores	2.2	2.2	—
Theaters	1.0	2.1	+1.1
Welfare. Y.M.C.A., etc.	1.6	3.8	+2.2

NORTHEASTERN STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	5.4	5.4	—
Banks	3.4	5.9	+2.5
Apartments	3.3	6.3	+3.0
Apartment Hotels	.2	1.0	+ .8
Clubs, Fraternal, etc.	3.4	2.7	— .7
Community, Memorial	1.0	1.3	+ .3
Churches	6.4	7.9	+1.5
Dwellings (under $20,000)	6.4	4.1	—2.3
Dwellings ($20,000 to $50,000)	3.7	3.9	+ .2
Dwellings (over $50,000)	2.8	2.5	— .3
Hotels	6.9	8.1	+1.2
Hospitals	7.3	7.1	— .2
Industrial	5.8	7.6	+1.8
Office Buildings	8.5	4.7	—3.8
Public Buildings	7.8	5.8	—2.0
Schools	13.6	16.8	+3.2
Stores	3.8	2.4	—1.4
Theaters	7.	2.4	—4.6
Welfare, Y.M.C.A., etc.	3.3	4.1	+ .8

MIDDLE STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	3.8	3.2	— .6
Banks	1.9	3.2	+1.2
Apartments	10.6	9.7	— .9
Apartment Hotels	6.0	5.5	— .9
Clubs, Fraternal, etc.	4.9	3.8	—1.1
Community, Memorial	2.4	1.0	—1.4
Churches	4.1	3.9	— .2
Dwellings (under $20,000)	2.8	2.3	— .5
Dwellings ($20,000 to $50,000)	2.1	2.1	—
Dwellings (over $50,000)	1.8	1.4	— .4
Hotels	6.0	5.7	— .3
Hospitals	6.3	4.1	—2.2
Industrial	6.9	8.7	+1.8
Office Buildings	15.0	17.0	+2.0
Public Buildings	7.5	4.9	—2.6
Schools	9.3	14 4	+5.1
Stores	2.3	3.1	+ .8
Theaters	4.1	4.2	+ .1
Welfare, Y.M.C.A., etc.	2.2	1.8	— .4

SOUTHEASTERN STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	4.8	5.3	+ .5
Banks	1.3	.8	— .5
Apartments	8.2	7.5	— .7
Apartment Hotels	2.9	3.6	+ .7
Clubs, Fraternal, etc.	1.7	1.1	— .6
Community, Memorial	.3	1.1	+ .8
Churches	7.4	16.3	+8.9
Dwellings (under $20,000)	5.1	4.8	— .3
Dwellings ($20,000 to $50,000)	4.7	4.2	— .5
Dwellings (over $50,000)	4.0	4.0	—
Hotels	11.7	10.1	—1.6
Hospitals	5.1	3.3	—1.8
Industrial	4.2	11.2	+7.0
Office Buildings	5.8	3.5	—2.3
Public Buildings	2.9	4.4	+1.5
Schools	21.6	9.3	—12.3
Stores	3.0	3.2	+ .2
Theaters	2.5	2.7	+ .2
Welfare. Y.M.C.A., etc.	2.8	3.6	+ .8

WESTERN STATES

Type of Building	*Requirements for New Buildings by Percentages*		
	1928	*1929*	*Change*
Automotive	3.0	2.4	— .6
Banks	1.2	2.2	+1.0
Apartments	11.7	14.3	+2.6
Apartment Hotels	5.9	7.1	+1.2
Clubs, Fraternal, etc.	2.3	2.7	+ .4
Community, Memorial	1.7	1.9	+ .2
Churches	6.1	3.4	+2.7
Dwellings (under $20,000)	4.3	4.1	— .2
Dwellings ($20,000 to $50,000)	4.0	2.5	—1.5
Dwellings (over $50,000)	2.7	2.2	— .5
Hotels	6.9	11.2	+4.3
Hospitals	6.3	5.6	— .7
Industrial	3.7	4.9	+1.2
Office Buildings	14.2	14.8	+ .6
Public Buildings	4.7	4.7	—
Schools	13.3	9.8	—3.5
Stores	4.1	3.9	— .2
Theaters	2.8	1.5	—1.3
Welfare, Y.M.C.A., etc.	1.0	.8	— .2

COMPARISON OF DEMANDS FOR NEW BUILDINGS IN 1928 AND 1929, BY DISTRICTS

CRAFTSMANSHIP

BY

WILLIAM O. LUDLOW

CHAIRMAN OF THE COMMITTEE ON RECOGNITION OF CRAFTSMANSHIP, NEW YORK BUILDING CONGRESS

THE Plasterer: "I have been at my trade for 40 years, and have been accustomed to the best work in New York. I do 100 per cent work if possible, and have monuments of my work throughout the city. I think the craftsmanship certificates help the spread of good craftsmanship. The buttons and certificates are the finest things in life."

Painter: "Everyone tries to get one. In the last few years I have had more time to do the work and do it right. Finest piece of plaster work in city done by Mr. Jones on the Seamen's Bank for Savings. It is a pleasure for a painter to work on that kind of work. The plasterers help the painters out."

Hoisting Engineer: "I feel highly honored by receiving the certificate, and the Missus feels that way also."

Architectural Carver and Sculptor: "One of the greatest things ever brought up; wonder it hasn't been taken up before. I am proud of my work."

Such are some of the comments made by workmen who have received from the New York Building Congress certificates and gold buttons for superior craftsmanship. Effort, time and money have been expended over a period of nearly four years, not merely to reward certain deserving workmen, but in an endeavor to raise the whole standard of workmanship in the building industry. We well know that higher wages, stricter supervision, and driving the men will not bring better quality; we must move their desires, awaken their pride, instill ideals. This whole movement of the recognition of craftsmanship, therefore, is an attempt to preach far and wide the gospel of quality work, and the 950 certificates of honor that have been presented to mechanics in New York are one of the means. It is of more than passing interest to inquire, therefore, if substantial results have been accomplished. Is better work being done, and has the spirit of the men been stimulated?

The comments of the honored craftsmen, themselves, such as have been quoted, tell us something. The opinions of some of New York's most prominent builders are also enlightening. I quote a few.

J. R. Kilpatrick, Vice-president of George A. Fuller Co.: "It is impossible to measure the concrete results of the recognition of the craftsmanship movement, but they have been remarkable in rehabilitating pride in craftsmanship. Undoubtedly the results of this work show in better quality of workmanship. The attitude of the men is improved."

Presentation of Certificates of Craftsmanship, Uppercu Cadillac Building, New York

Craftsmen Receiving Certificates at the Bank of New York and Trust Company

William O. Ludlow presenting certificates; Edwin J. Merrill, President of the Board of the Bank; Benjamin Wistar Morris, Architect, and Robert Eidlitz, Builder, are present

D. T. Webster, of the firm of Marc Eidlitz & Sons: "It has created a spirit of emulation,—workers are talking about better craftsmanship,—they are thinking about it. They now have a target to shoot at,—something to strive for. The results cannot be measured, and if they could, it would not be advisable to do so."

John Lowry, of John Lowry, Inc.: "More enthusiasm is put into their work. The men have a desire to do better work and are stimulated by the awards. There is a better spirit created by the awards, and no doubt about it."

Christian G. Norman, Chairman of the Board of Governors of the New York Building Trades Employers' Association: "The building industry generally is looking forward in its line of progress to doing things better, and the incentive for the workman not only to draw a substantial wage but to be proud of what he is doing should be properly instilled. My reaction to the craftsmanship movement of the Building Congress is that it is being talked about to a considerable extent among the workmen, and anything that makes for better quality work should be encouraged."

And what has labor itself to say? John Halkett, President of the New York Building Trades Council, in speaking to a group of honor craftsmen, remarked: "You are a credit and an honor to the Building Trades Council. You must encourage and inspire others who have thus far failed to obtain recognition. The New York Building Congress has exerted great influence in New York, and there has been harmony during this period between employer and employe."

John J. Collins, Secretary-Treasurer, International Union of Tunnel & Subway Constructors of North America, says: "Labor heartily joins in doing its share to encourage better workmanship. It sees a great value to all concerned, including the public. Public recognition, with its accompanying certificate and gold button is a reward that brings real satisfaction to the worker and an incentive to his fellow workers. I see an increasing eagerness on the part of the workers to measure up to the title of 'Craftsman.'"

Alexander Kelso, Secretary-Treasurer of the Carpenters' District Council says: "One of the achievements of the New York Building Congress is the recognition of the craftsman who has shown outstanding workmanship in his trade. It is something new for the mechanic to be so honored. We have all seen tablets at the entrances of buildings on which are inscribed the names of the engineer, architect, contractor and banker as men

The Chairman Presenting Craftsmanship Certificates, New York Life Insurance Building
Darwin P. Kingsley, President, New York Life Insurance Company. in center

who have erected the structures. We have to thank the New York Building Congress through its Committtee on Recognition of Craftsmanship for giving the workman his delayed recognition."

Comments such as these seem to indicate that the program of the awarding of certificates is not only meeting with general approval but that it has had a far-reaching result. We know at least that the 950 men who have been honored have a new attitude toward their work, have received a new inspiration, and a new incentive. Perhaps it is safe to say also that a large proportion of the thousands of workmen who have witnessed the presentation of the certificates to these 950 men have had their ambition stirred, pride in craftsmanship awakened, and now realize that "someone cares." Moreover, the hundreds of articles, news items and editorials that have been carried by all of the leading papers, the radio broadcasting and the magazine articles that have a countrywide circulation have had influence, it is fair to presume,—perhaps intangible, but nevertheless real, definite and enduring.

For the stirring of the spirit of pride of craftsmanship there never was a time more opportune than these years of prosperity, and perhaps there never has been a body of workmen who by reason of their general intelligence were more ready to be convinced that there is nothing more satisfying in life than work well done. We have started with our work of recognition of craftsmen in New York in the building trades, but suppose that this kind of recognition spreads further? Suppose it spreads to other industries and other occupations and to other cities? I believe it is possible that there may be awakened throughout our land a will to do good work, an appreciation of the spiritual value of craftsmanship and the happiness it brings, and that there may be stirred in many workers a new and mighty ambition. Then we shall have done our part in reviving the interest in superior craftsmanship that we so sorely need, and then we shall have done our part in bringing into the lives of some men a new usefulness and a new contentment. Perhaps then we shall have done our part, too, toward bringing to the American people a new and a worthier citizenship.

Editor's Note. Mr. Ludlow will explain in a second article the way in which the New York Building Congress has organized and conducted its activities in the recognition of craftsmanship.

WHAT IS A GOOD CRAFTSMAN?

The following definition was part of a talk given by William O. Ludlow, Chairman of the Committee on Recognition of Craftsmanship, to a meeting of Honorary Craftsmen members of The New York Building Congress in Carpenters' and Joiners' Hall, Madison Avenue, New York, December 7, 1927

A GOOD CRAFTSMAN first of all is a man who does first class work in his trade; he is known by his workmanship; nothing he does is shoddy, ugly or of poor quality.

"A good craftsman is loyal. He is loyal to his union, for he believes that no union man has any right to injure either his union or anyone in it, and he believes that any man who belongs to a club or a society or a union is bound to help that organization along in any way he can.

"A good craftsman is loyal to the men of other trades. He never intentionally or willfully injures the work of another workman. If he is a carpenter, he doesn't draw pictures on white plaster walls, and if he is a plasterer, he doesn't drop mortar on a newly laid floor.

"A good craftsman is loyal, also, to his employer and the owner, for he knows that he has sold to them his eight hours a day and his skill, and he would no more expect to loaf on the job or do poor quality work than he would expect his grocer to take his money for a barrel of potatoes and then give him the barrel half full, or the potatoes half rotten.

"A good craftsman realizes that buildings are produced by coöperation,—coöperation all the way down the line from the owner to the laborer,—and he rightly feels that his part in the construction of a building is just as necessary and just as important as the architect's or the contractor's part; he is proud to point out the buildings he has had a hand in building.

"A good craftsman, moreover, never forgets to give a word of advice or encouragement to the apprentice or show him how to do a job. He is quick to help his brother mechanic when he needs a hand, and he is the first man to pick up the fellow who meets with an accident. He is never a grouch, and when he is about, things seem to go better on the job.

"And then a good craftsman is a man with a happy look on his face. Why shouldn't he have a happy look? His day's work is no mere grinding out so many hours for so many dollars; he has given to his work the most precious things he has,—his interest, his skill, his best effort. Every day when he quits, he looks over his work with pride and satisfaction for he knows he has done a good job, and he brings home to his wife and 'kiddies' contentment and happiness. Because he is a good craftsman, he is a good fellow, a good husband and a good father, a worthwhile man in his community,—a good citizen.

"Now you and I do not know whether the years ahead of us are few or many, but some day perhaps we shall stand before the Great Craftsman Who made all things, and perhaps we shall be asked 'What have you done?' I think the good craftsman will answer: 'I did the best work I knew how.' "

THE CLIENT, THE ARCHITECT AND THE CONTRACTOR

PART II—THE ARCHITECT

BY

CLINTON H. BLAKE

IN referring in my preceding article, in the November issue of THE ARCHITECTURAL FORUM, to the attitude of the owner, I pointed out that in most cases the owner has either a very poor opinion of architects in general or an unreasonably exalted view of the profession. While the converse of this is not entirely true, it is true that the architect, as a rule, considers that the client is either wholly lacking in building and design sense and knowledge, or else that he has a very general and more or less complete knowledge of building customs and problems and understands all the essentials of architectural practice and the customs of the architectural profession. It would be perhaps a trifle more accurate to say that ordinarily the architect holds a point of view which is a composite of these two ideas. He is, I am afraid, rather scornful on the whole of the layman's knowledge of buildings and their construction and plan, but on the other hand, although it may be paradoxical so to do, he assumes too often that the layman has a rather full understanding of the practices and customs of architects. The architect is likely to prove wrong on each of these points. While many clients are wholly helpless in the face of a sketch or plan drawings, and are more or less paralyzed at the sight of specifications, there are many who have the ability intelligently to read sketches or plans, to visualize the finished work, and to analyze and constructively criticize the proposed specifications.

Where the owner is equipped with a fair amount of common sense and knows what he wants and can analyze and make clear his requirements, his coöperation may be of very great value. I have known repeated instances, however, where the architect, having to deal with an owner of this character, has nevertheless proceeded on the theory that the owner was a very minor element in the transaction; that his chief function was to pay bills and ultimately enjoy the fruits of the architect's and contractor's labor, and that it would be a waste of time to seek his coöperation in so far as any practical advice relating to the work was concerned. I know of many cases where a much better result would have been secured and a great deal of difficulty for all concerned avoided, if the architect had given the owner an opportunity to discuss some of the problems involved and had been content to heed some of the advice which the owner volunteered.

The fact that one is an able business man does not, it is true, necessarily qualify him as a critic in design or construction. On the other hand, there is much of common sense in the practice of every profession, and the advice and help of an intelligent and common-sense client is not to be despised. No one can sympathize more heartily than I with the difficulties which architects encounter in dealing with clients who are not qualified to advise but who, apparently for that particular reason, consider themselves qualified to do so. I would emphasize merely the thought that, while there are clients of this character, there are others who can be of real help to their architectural advisers. Even if their advice is not taken, a little tactful discussion with them now and again, which gives to them the thought that their ideas are being considered and made use of, will yield good diplomatic results. On the other hand, the architect cannot, in justice either to himself or to his client, assume, as is so often assumed, that the client is acquainted with architectural customs and practices. In this connection, I have in mind especially the matter of the ownership of plans, the matter of extras and supervision, changes in the plans and the like. The architect owes it to both the client and to himself to make these points clear to the client, so that the latter may understand the basis on which they are proceeding, the possibilities of additional cost, the scope of and limitations upon the architect's services, and similar points entering into their relationship and into the operation.

I have had occasion many times to point out to the profession the prevalent misconception on the part of architects of the law with respect to the ownership of plans. As I have indicated time and again, the ownership of the plans, as a legal proposition, in the absence of a contract to the contrary, is vested in the client who has ordered and paid for them. This is far better understood by architects than it was a few years ago. Nevertheless, in repeated instances, architects are still proceeding under the comfortable delusion that, because it is the custom of the profession that the plans as instruments of service belong to the architect, the client must recognize the fact that this is so. A client is not necessarily presumed to be acquainted with the customs of the architectural profession. He is not necessarily bound by any such customs, where he has no knowledge of them and they have not been brought to his attention or been impliedly made a part of his understanding with the architect. A special custom, as a matter of fact, is one of the weakest reeds upon which legal rights can be predicated.

If it can be shown that the client was acquainted with the custom and made no objections to it, proof might be admitted and the custom sustained. For example, if the client had dealt with the architect previously and knew that it was the architect's custom to assert ownership to the plans or to charge, in the absence of agreement, a certain rate, the client would be held, in further dealings with the architect, to be in effect placed on notice and, in the absence of a definite agreement, to be willing impliedly to go ahead on the same basis as that on which they had formerly dealt. It is such a simple matter, however, to cover such a question as to the ownership of the plans by specific agreement, that any architect is foolish to trust to proof of custom or to an implied understanding with the client on this point. The chances are decidedly against his being successful, unless he can show a specific agreement, and it has become clearly manifest that the tendency of the courts is opposed to sustaining the architect's ownership of the plans on the basis of custom rather than specific agreement. To protect his right to the ownership of plans, therefore, the only common-sense and safe course for the architect to follow is to have a definite agreement with the client on this point by which the ownership by the architect of the plans is clearly covered and recognized.

The architect is somewhat likely, also, to assume that the client realizes the expense involved in the preparation of plans and specifications and especially in the carrying out of successive changes in the drawings. The client has a very limited understanding of these things. As I said in discussing his point of view, he has no conception, ordinarily, of the time involved in producing drawings and details. He is more impressed by the specifications, because they appeal to him as a business contract and he can see from examining them that they involve considerable care and effort. The drawings do not produce in him any such reaction. It seems to him a simple matter to make changes and to make still further changes. He looks upon these as more or less routine matters which can be easily carried into effect by the architect and which do not involve real time or expense. He realizes in a very limited way, if at all, the amount of time that must be given to a study of the whole problem as it is affected by the changes which he requests or of the expense for draftsmen and for service which these changes will mean to the architect. He has little conception, also, of the expense which changes will mean to him personally, in additional extra charges by the contractor. When these charges come in, he will be both astonished and angry in manv cases, and often the nearest target at which his displeasure can be aimed under these conditions is obviously the architect.

One of the chief problems connected with this question of changes in the plans is how fairly to recompense the architect for his extra work. The Institute form of contract properly provides fo extra payments to the architect for changes in the scheme originally adopted. The practice of architects in the application of this principle varies widely. Generally speaking, in practices of a more commercial character the architect is inclined to stress the point very little and to make any changes within reason without any material increase in compensation. Other architects, especially in residential work, stand strictly on their rights and expect and collect additional compensation for any material changes.

The handling of this matter with the client requires considerable tact and diplomacy. It is necessary that each client be approached in a particular way and each case handled on its own merits. The important fundamental fact, however, is that the architect, if he intends to seek additional compensation for changes ordered by the client, can in large measure prevent misunderstandings and ill feeling, if not more serious complications, by making clear to the client in the first instance the fact that the architect will expect and is to receive extra payment, if changes in the plans as prepared and at first approved are made. In some cases, this compensation will amount to a modest sum; in others, it may involve the re-drafting virtually of all the plans and a restudy of the whole problem. In this case, the architect will legally and morally be entitled to substantially a new fee in addition to that already earned. From my talks with clients as well as with architects, I know that the client ordinarily does not understand a request for additional payments by the architect for changes in the plans. He resents such a request and feels that it is unfair, unless he has been prepared for it in the first instance and unless the circumstances which make it proper and equitable have been explained to him. It is not a difficult matter for the architect to bring home to the owner tactfully and without over-emphasizing it, but nevertheless clearly, a true understanding of these points. He can make clear to him something of the work and expense which changes in the plans involve from the point of view of the architect, and he can warn him against extras and against making changes which will inevitably result in extras. By putting the owner on notice in these respects, he will be doing him a real favor, and he will be doing himself a great service at the same time.

One of the most dangerous and yet most common points of misapprehension on the part of the architect has to do with his position as agent for the client. He assumes all too often that his appointment as architect carries with it a general agency and authority to do whatever he thinks necessary within rather wide limits in connection with the building operation. If he has an agreement with the client which gives him power to make changes and act in general in the client's behalf, he is protected in doing so. It is a very exceptional case, however, where any such general agency is granted. The standard form of contract and the contracts ordinarily in use throughout the profession give to the architect very limited agency powers and discretion. The recent amendment to the Institute's form of contract, providing that the architect may make minor changes in the work, not involving extra cost and not inconsistent with the purpose of the building, is a step in the right direction. I am afraid that most architects, however, feel that they have the right, irrespective of any contract, not only to make such minor changes, but also to make, without the authority of the owner, changes in many particulars which involve various extra charges.

The architect will do well to disabuse himself of any such delusion. The only safe course for him to follow is to adhere strictly to the specific authority given to him and, where he wishes to depart from it, to secure the approval and clear authorization of the client. Any other course will inevitably result, not only in misunderstandings between the client and himself and between the client and the contractor, but will lead in many instances to his being held liable for the additional cost to the client of alterations and changes put into effect without the latter's approval.

The agency of the architect may be what is known in the law as an "express" agency, or it may be an "implied" agency. An express agency is one granted in express terms. If the owner in so many words gives the architect the right to make specified changes in the plans or specifications or to deal in certain specified ways with the contractor or others, this constitutes such an express agency. On the other hand, an implied agency is one which has not been expressly granted, but which is legally assumed to result from certain acts of the principal or the surrounding circumstances. Obviously, an implied agency is a rather dangerous proposition. No agent can safely proceed on the basis of an implied agency only. An architect, especially, cannot do this. If he limits his acts to authority which has been given expressly, and if he secures this authority in writing, he cannot well go wrong.

Many architects assume that they have authority to act when, in fact, in the eyes of the law they have no such authority. In some cases they assume that they have the authority, simply because they are acting as architects. In some instances they assume they have it as the result of something which has been said or done by the owner. If the owner should say to the architect, for example: "I cannot be bothered with changes in the work,—please attend to them," many an architect would, with considerable show of reason, construe this as giving him full power to handle any changes which may be involved. The owner, on the other hand, by this remark, may have in mind simply routine changes, involving no substantial additional outlay, if any, and not changes involving substantial extras or varying in any material respect from the plans or specifications. The architect should not, in his own interests and in the interests of a proper understanding with his client, indulge in any assumptions when this matter of agency is involved. It is a simple matter for him to secure the specific approval and authority of the client where this is required, and he will be far wiser to assume too little rather than too much authority.

There is another phase of the architect's activities, however, in which he can assume responsibility without the danger of laying himself open to criticism or claims for damages. This phase has to do, not with his agency powers, but with his general advisory powers. One of the most common criticisms of architects which I have heard from clients is that the architect considers that he has done his full duty when he prepares the plans and specifications and supervises construction. There are many ways in which he can render much appreciated service to the client beyond the strict limits of his employment. In advising the client, in giving him a somewhat broader service than usual, in general advice and attention, in suggesting to him certain danger points which he should have in mind, in making clear to him the status of the contractor and the like,—in all these ways, he can both aid the client and build up with the client good will which will be of real value in the future as well as in the present. The client, as a business man, appreciates his architect's making suggestions which safeguard the client on the business phases of the operation. What I have in mind can perhaps best be summed up in the word "service." The service given the client by the architect may go far beyond the limits of the legal duties of the architect strictly construed. It will cost the architect something more to give this service, but the increased good will of his clients which will result from it will be substantial dividends.

When it comes to making estimates and dealing with cost figures, many architects are inclined to proceed far too casually. This is perhaps one of the most serious points of controversy in many cases between the architect and the client. It holds, also, probably, more of real danger for the architect than any other phase of his activities. The architect assumes too often that, when he gives to the client a cost estimate, the client accepts it with the understanding that the architect is merely making his best guess and that the figure is wholly tentative. The client, as I have pointed out in the preceding paper of this series, does not, however, accept an estimate in this spirit or upon this understanding. He is far more likely to accept it as an estimate given by an expert who by training and knowledge is in a position to give accurate figures. When it develops that the cost of the work far exceeds the amount of the estimate, he will in some cases feel that he has been "led on" by the architect, and in other cases he will feel that the architect is incompetent. Either feeling may be and probably will be under these conditions unjust to the architect. The client's point of view as to this, however, results usually from the fact that the architect has not made clear to him his limitations as a prophet of cost.

It is not a difficult matter for the architect to make clear to the client who is at all reasonable the fact that cost figures are today so variable that no one, however expert he may be in the profession or in the building game, can prophesy with accuracy. He can point out to the client that he is giving his estimates for what they are worth, and for nothing more. If the client insists on a more definite commitment, the architect can refuse to give the estimate or, if he feels that he must give it in order to hold the client's favor, he can at least discount increases in building costs with sufficient liberality so that the figure which he gives will be high rather than low. The client is naturally interested in the cost of the work. It is natural, also, that he should feel that the architect is in a position to give him that cost with substantial accuracy. The architect should see to it that he is set straight as to this and that any estimates given are so framed that they do not by any chance amount to definite cost representations or guarantees.

Differences and misunderstandings between the architect and the client are being materially lessened in number by the increased use of written contracts between them. Much missionary work in this field remains to be done, however. There are still many architects who feel that the use of a written contract with a client is impractical, and there are even those who maintain that it is in some way unethical. I had quite a spirited argument with one of the latter group not long ago. His position was that he would cheapen in some way his professional status if he requested his client to sign a written contract, and that by so doing he would become in effect a business man rather than a professional man. I do not think that there are many architects who hold this view. There are, however, a great many who feel that to ask the client to enter into a contract will create a bad impression and may result in the architect's losing the commission. This feeling is based, I am convinced, on a misconception of the attitude of the ordinary client. The latter does not object to the architect's desire that the dealings between them be reduced to a concrete and written understanding. On the contrary, he welcomes such a suggestion, both because it is in line with sound business and the methods which he himself would adopt in business dealings, and because, also, it confirms him in his feeling that he has secured the services of an architect who is practical and businesslike. The client wishes to feel that he has secured the services of one who has real artistic ability. He is just as keenly interested, however, in feeling that he has secured the services of one who is practical and in touch with business methods and needs. Now and again it is quite possible that a client will be encountered who is not willing to sign a contract and who may resent being asked to do so. Any unpleasantness resulting from these isolated cases, however, will be more than compensated for by the favorable impression created in the minds of other clients by the evident desire and determination of the architect to deal with matters on a business basis.

So far as the attitude of the architect and contractor is concerned, it is my experience that it is on the whole one of understanding, coöperation and fairness. Some architects undoubtedly view the contractor as one to whom they have no obligation, and consider that they are justified in acting as the advocate of the owner alone. The great majority, however, realize that they owe an obligation to the contractor, as well as to the owner; that while they are employed by the owner and must act primarily in his interest, they are not expected to take any action which is unjust or unfair to the contractor; that where they are called upon in effect to arbitrate between the two parties especially, and to make more or less judicial decisions as between them, they must act with fairness to both and with impartiality.

The contractor has just as much right to expect fair treatment at the hands of the architect as the client has to expect it. Confidence on the part of the contractor that he will receive fair treatment is a mighty valuable asset in any building operation. If the contractor is assured of this fact, he will very readily place himself on many points in the hands of the architect, where otherwise he would refuse to do so; he will defer to the decisions of the architect, without complaint, and will in general coöperate in securing the prompt and satisfactory completion of the work, where he would fail to do this if he felt that the architect would not stand behind him on any issue where right is on his side. The existence of such cordial understanding and confidence between architect and contractor is to the owner's interest.

BETTER STUCCO HOUSES

PART III

BY

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ON September 16, 1928 a hurricane, the maximum velocity of which was conservatively estimated at more than 100 miles per hour, again swept over parts of Florida, teaching to builders by the types of its devastation precisely the same lessons about building construction that were taught by a similar hurricane just two years previously. The lessons of the disaster in 1926 were well taught, but they were not heeded, either because of willful disregard by unscrupulous builders or because of the well known American inclination to take a long chance. In either case the result was the same; preventable damage running into many millions of dollars occurred.

It will be very instructive to review a typical sequence of events during such a gale and suggest, as the narrative proceeds, feasible remedies for certain weaknesses which experience has revealed in the construction of this type of building. The problems involved in the foundation and in the framing up to the roof line were discussed by the writer in articles which appeared in the August and November issues of THE ARCHITECTURAL FORUM. The present article deals with the subjects of roof framing and coverings for hurricane regions, and with chimney design for localities that are visited by severe earthquakes.

Roof Coverings. This is a very difficult problem when the roof is of the gable type. Practically every kind of covering has been ripped off by strong hurricanes,—the various kinds of tile, slate, sheet metal, sheet composition, composition shingles, metal shingles, asbestos-cement shingles, and wooden shingles. The wooden shingle seems to have the best record for staying on, but wooden shingles should not always be used because of the great fire hazard they present. However, a valuable conclusion may be drawn from the superior behavior of the wooden shingle. The writer believes that this superiority is due to the fact that only about 30 per cent of its surface is exposed to the wind; this permits the nails to be placed low, which, in conjunction with the stiffness of the wood, renders the shingle very resistant to uplift. On the other hand, nearly all the types of metal shingles on the market,—they are made in aluminum, copper and zinc,—and also the asbestos-cement shingles, have very little overlap compared to their exposed surface area, with the result that when a strong wind gets under these metal shingles, they may be uplifted like hinged trap doors. In addition, some manufactured shingles are brittle and tend to crack at the nail holes. This is particularly true of those laid in hexagonal fashion, where the overlap is very small.

The writer believes that both the non-ferrous metal and the asbestos-cement shingles would prove satisfactory in hurricanes if the overlap from above were arranged by the manufacturer to be about 65 per cent. The exposed surface should not exceed about 8 inches in width by 6 inches. While such a large overlap would practically double the cost of the covering, its hurricane resistance would insure permanence that would mean much greater ultimate economy, because the damage by water to the interior of a house is likely to be very great after a storm has destroyed the roof. Furthermore, the metal shingles could be stiffened by pressed longitudinal ribs and edge flanges so shaped that the exposed edges would lie flat against the shingles below, and thus prevent the wind from wedging in between. Asbestos-cement shingles might be made thicker to strengthen them for the abnormal strains. They could be moulded wedge-shaped like wooden shingles so that, when nailed, they would lie flat, because the wind must not be allowed to get under any part of the roof covering. Asbestos-cement shingles would then be preferable along ocean shores where the atmosphere is very corrosive on metal shingles because of its high content of wind-blown salt water globules. In other regions, in order to reduce corrosion to a minimum, copper nails could always be used with copper shingles, and heavily galvanized steel nails with either zinc or aluminum shingles. If, for example, copper nails are used with either zinc or aluminum shingles, the electrolytic action that produces corrosion is intensified; this will greatly reduce the otherwise long life of these shingles. Composition shingles and composition sheet roofing both lack stiffness, are readily torn in high winds, and cannot be so securely attached. If it is easy for the wind to get underneath, the covering is then doomed. This is true of sheet metal coverings.

The experience with burned clay roofing tiles in hurricanes has not been very satisfactory. Not only have the roof coverings been destroyed, but the flying fragments cause immense damage by breaking windows in nearby houses. The breaking of the windows frequently constitutes the first step in the destruction of a house by hurricane. The wind must be kept out of a building. This means that special precautions must be taken to protect openings. The use of large single panes of glass should be avoided. Where hinged wooden shutters or rolling steel shutters, as described in the previous article, are not feasible, very heavy

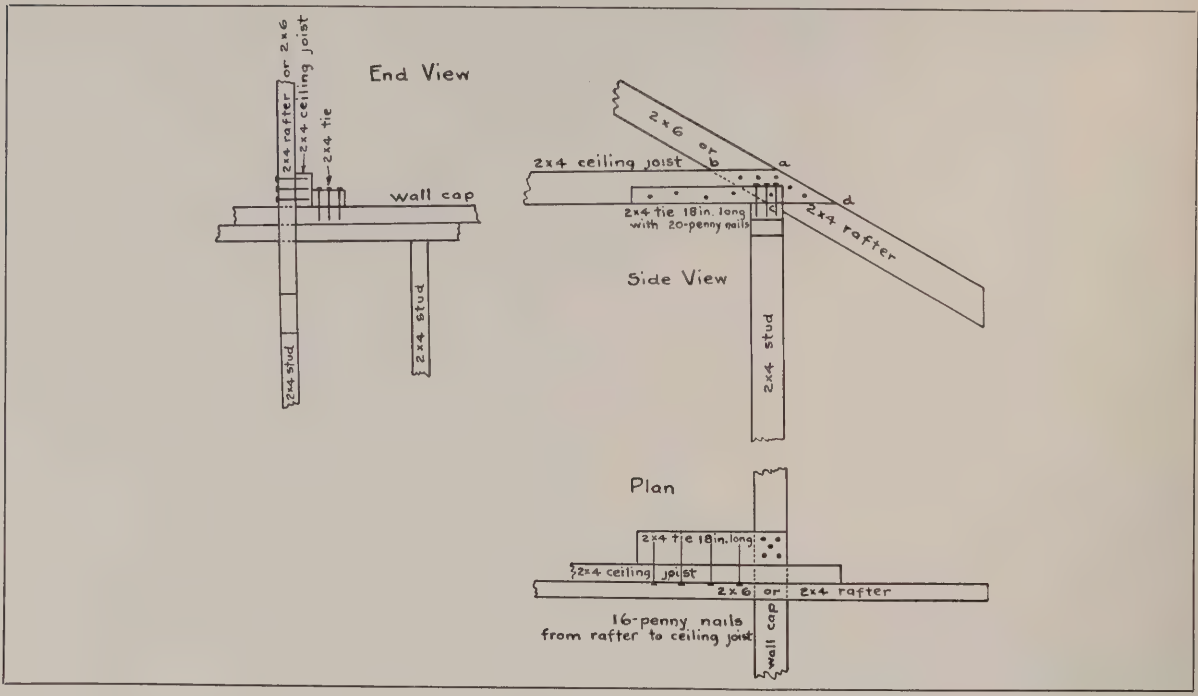


Fig. 9. A Method of Anchoring the Roof to the Exterior Walls

glass in subdivided all-steel frames designed to withstand a wind pressure of 40 pounds per square foot of window surface will prove adequate. Since flying pieces of roofing tiles have been known to penetrate even stucco walls during a hurricane, unprotected windows, even in steel frames, however heavy the glass, would surely be broken in regions where there are tile roofs. The writer is aware of the immense difference in architectural charm between a roof of hand-made mission tiles laid irregularly and one of machine-made tiles attached with monotonous regularity. But irregular laying does not permit the upper tiles to be nailed, and hence they are merely wired to keep them from sliding down the slope of the roof. In consequence, during a heavy gale they are uplifted, dangle at the ends of the wires, and are soon dashed to pieces. The folly of laying tiles without even wiring, when the slope of the roof is very gentle, is too apparent to even require comment.

Both the hazard and the menace of the loose or wired tile roof would be considerably reduced if proper precautions were taken in laying the roof. Of course, a substantial weatherproof roofing felt should first be laid on solid, smooth roof sheathing; then on top of the felt, at spacings varying from 10 to 14½ inches, depending on the type of tiles to be used, there should be placed 2 by 3- or 2 by 4-inch wooden roof strips to which the upper tiles are to be nailed. At the spacings, these wooden strips will assist materially in holding down the felt, and, provided the felt is well cemented along its horizontal edges, they will thus keep the roof rain-tight, should some of the tiles be blown off. Machine-moulded tiles are usually much stronger than the hand-made. Manufacturers should provide two nail holes spaced about 4 inches apart along the center line of each tile, instead of only one, as is the present practice. The top tiles should be attached with two 10-penny nails in conjunction with lead washers, so that the nails can be driven just tight without breaking the tiles; the bottom tiles should be attached with two 8-penny nails and lead washers. While the inherent weakness in nearly all patterns of tiles lies in the fact that they must be so laid that the wind may gain access underneath the tiles, the writer nevertheless believes that two-nail, machine-made tiles regularly and carefully nailed, as described here, should weather any storm, if they are not exposed to a bombardment of debris.

When the roof is of the flat type, surrounded by a parapet wall, another type of construction will give not only a hurricane-proof covering but also a permanent wearing surface capable of withstanding all the hard usage that ordinarily comes on floors, thus adding another, though open, story to the useful floor area of the building. Referring to Fig. 8 (page 746) of the article in the issue of November, 1928, it will be seen that the parapet wall should be made low, preferably not more than 20 inches high. This is to minimize the overturning moment of the wind against the wall. The diagonal sheathing of the top story should extend without break clear up to the coping of the parapet. This will prevent the overturning of the parapet wall, a frequent type of failure,

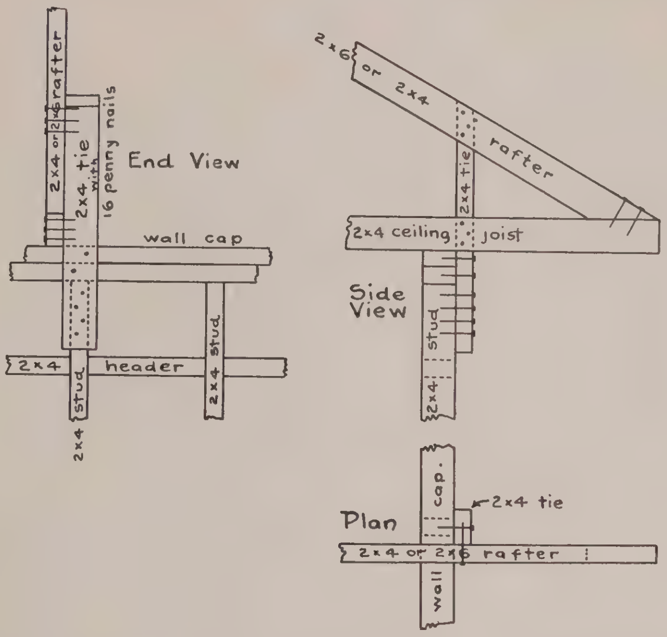


Fig. 10. Another Method of Anchoring the Roof to the Exterior Walls

which permits the wind to get under and raise the roof. The roof boards should be of 1-inch dressed material laid solid and diagonally on 2 by 6- or 2 by 8-inch ceiling joists spaced from 12 to 16 inches, center to center, depending on their span. The entire roof area should then be covered with a layer of sheet lead 1/16 inch thick, lapped and soldered at all joints and brought up 4 inches as flashing at all sides and at chimneys and vents. On top of the lead a continuous slab of concrete should be poured to a uniform thickness of at least 1½ inches; 2 inches would be better. In order to resist shrinkage and thermal stresses, the slab should be reinforced by electrically-welded steel fabric placed at its half depth. A rectangular mesh composed of No. 11 gauge wires, spaced 6 inches in each direction, would be satisfactory. The concrete should consist of a 1 cement: 1½ sand: 2½ crushed rock or gravel mixture to which is added the least quantity of water that will produce a dense and workable mass. The sand should range in size from fine to ¼-inch; the coarse aggregate, from ¼-inch to a maximum of ½-inch. Particular care should be taken to keep the slab constantly moist by spraying it for a period of ten days after pouring so that this thorough seasoning will insure high abrasive resistance in the wearing surface. The lead lining is necessary to insure a water-tight roof. The roof boards are necessary to support the lead lining. Wherever such a concrete-slab flat roof or a tile-covered gable roof is used, the exterior walls and underpinning must be particularly well braced in localities where earthquake resistance is a factor to be considered, because such coverings make a building top-heavy; their inertia subjects the walls to very severe horizontal thrusts.

The Framing of Gabled Roofs. Whatever the type of covering, the foundation of a roof should always consist of 1-inch dressed boards laid solid. For coverings of the lightest weight, 2 by 4-inch rafters should never be spaced more than 24 inches apart, while for tiling, 2 by 6-inch rafters may require a 16-inch spacing. Where a roof is without hips or valleys, the rafters must be diagonally braced in the plane of the roof in the same manner as described previously for outside walls. The anchorage of the rafters or framing of the roof to the walls is a critical feature in designing against hurricanes. Figs. 9, 10, 11 and 12 give full details of some satisfactory types of anchorage at outside walls. To avoid splitting wherever large nails are shown concentrated in small clusters in short splices or tie pieces, these timbers should be drilled to receive the nails. In Fig. 12, 1 by 8-inch ties and truss members are advocated where shown so as to provide ample nailing areas, a b c d, for many 8-penny nails. Fig. 10 shows the strongest anchorage. The smaller the overhang of the roof at the eaves, the less will be the wind pressure in this pocket.

In conclusion, from the standpoint of resistance to hurricanes, the best type of roof covering is a 2-inch flat reinforced concrete slab surrounded by a parapet wall not higher than 20 inches and continuous in construction with the wall of the story below, Such a roof is also fireproof. Being lined with sheet lead, it should remain leak-proof.

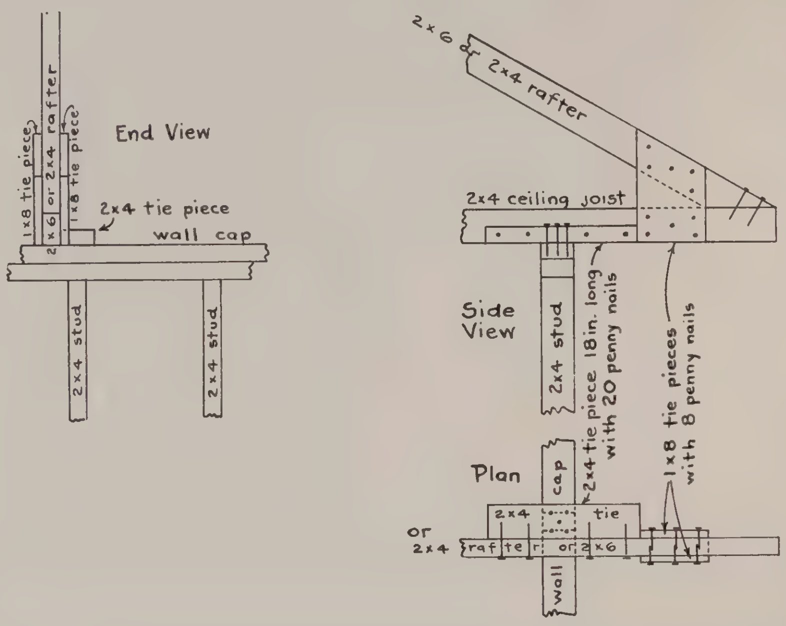


Fig. 11. A Third Method of Anchoring the Roof to the Exterior Walls

Chimneys and Fireplaces. Until comparatively recently, brick masonry in conjunction with fire-clay flue linings has been used almost exclusively for this purpose. As a precaution against fire, insurance underwriters require a clear space of at least 2 inches between all wooden framing and the outside of a brick chimney. This means that structurally the chimney stands completely isolated from the frame of the building; they are not in contact; the chimney is not anchored to the frame. When the building sways during a severe earthquake, so does the chimney, but they do not sway in unison; they cannot, because of the dissimilarity in the distribution of their masses. Consequently, there is impact between chimney and building, because the 2-inch clearance is insufficient to allow the chimney to sway freely within its enclosure, either within or at the side of the swaying building. Such impact is very injurious to the chimney, because brick masonry is not only inflexible but also very weak in tension perpendicular to joint. The chief break occurs usually at the roof line; serious cracks probably occur also at other places concealed within the wooden walls, and constitute a great fire hazard, frequently not suspected. If the mortar is weak, the top disintegrates into separate bricks as it falls; if the mortar is strong, the entire top falls in one mass, sometimes through the roof. If an attempt is made to anchor the chimney to the roof by running metal stays from the roof to a metal collar surrounding the chimney, such stays will probably operate to push over the chimney top. Isolated brick chimneys, already built and standing apart from other structures, as they occasionally do at factories, may be protected against earthquake damage by enclosing them throughout their entire height in a steel cage composed of vertical and horizontal structural shapes welded together, but such a method is not practicable for residential brick chimneys.

After severe earthquakes the writer has seen brick chimney tops thrown down by the hundreds, outside brick chimneys in complete ruins, and some inside brick chimneys dropped down through houses into the basements, as the result of structural collapses of brick fireplaces. The behavior of brick and other block masonry chimneys in the past amply justifies the conclusion that they cannot withstand severe earthquakes without being seriously damaged. Therefore the writer strongly advocates the use of reinforced concrete in place of brick for residential chimneys where earthquakes occur. Reinforced concrete is flexible; it can stand tension and bending without being seriously fractured. When correctly designed and properly constructed, it possesses great tenacity. These are the qualities that make reinforced concrete structurally so superior to brick masonry for chimneys in earthquakes. If the architectural design demands a brick chimney, it is very easy to use a brick facing on a reinforced concrete structural core, but there must be a sufficient number of wire anchorages from concrete to brick at definite intervals, vertically and horizontally, as otherwise the bricks will be shaken off.

In constructing a reinforced concrete chimney, the fire-clay flue lining is used as the inside form.

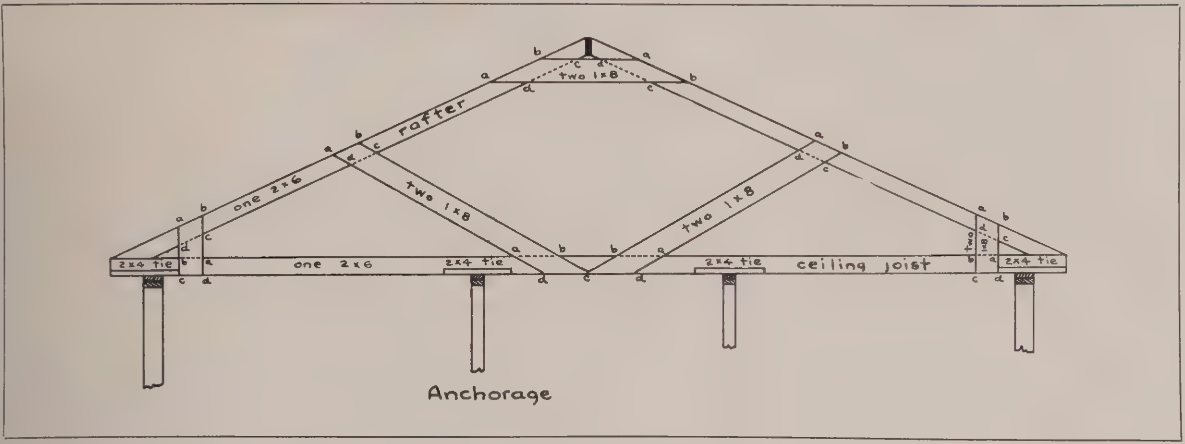


Fig. 12. Anchorage of Roof Framing Against Hurricanes

Reinforced concrete is superior to brick also in that it lends itself more easily to producing solid construction where flues from lower stories must be curved around fireplaces. Furthermore, at no increase in cost, reinforced concrete permits the use of circular flues, which are much more efficient for unit area of opening than square or rectangular flues.

For a single-flue chimney of average size in a one-story building, the minmum thickness of reinforced concrete wall, exclusive of flue lining or outside brick facing, if such there be, should be 6 inches, if the flue is square or rectangular. If the flue is circular, it may be 4 inches, but the walls of the fireplace should be of at least 6 inches in addition to the lining of brick. Since it is difficult to line the inside surface of the sloping walls of the smoke chamber above the fireplace, this lining may be omitted if the thickness of the concrete there is increased 1 inch. In the basement and lower story of a two-story house this minimum should be increased 1 inch; it should be 7 inches for circular flues also, if the chimney contains a fireplace at the second story. In the basement and lower story of a three-story building, the minimum thickness, irrespective of the shape of the flue should be 8 inches. The thickness of the fireplace walls should never be less than the thickness of the chimney walls immediately above the fireplace. These minimum thicknesses are merely suggestions for average cases. If a chimney contains a large number of flues, or very large flues, they should be increased by 1 or 2 inches. The minimum thickness of concrete between adjacent flues in a multiple-flue chimney should be 3 inches for circular flues, but 4 inches for square or rectangular flues.

The concrete mixture should not be leaner than 1 cement: 2 sand: 4 gravel or crushed rock; preferably it should be about 1: 1½: 2½, because it is very necessary that the chimney walls be strong, and particularly that they be non-porous. The sand should be graded in size from fine to ¼-inch; the gravel or crushed rock should vary from ¼-inch to a maximum of 1-inch. The minimum amount of water should be used that will produce a workable mixture which will settle readily in the form when slightly rammed with an iron rod. In constructing the form, one side should be left open; this side should then be closed from the bottom up,—only about 3 feet in elevation at a time, so that there may be easy access for thorough tamping as the concrete is being poured. The entire form should be kept moist by sprinkling for 7 days after the pouring.

The reinforcement should consist of corrugated round or square steel bare placed vertically, together with square or rectangular intermittent horizontal loops at regular vertical intervals. These loops act as lateral ties for the vertical reinforcement; they are wired to the verticals and should inclose them completely. In multiple-flue chimneys they should have cross ties of the same size, as shown by AB and CD in Fig. 13. The ends of the loops must be securely anchored, as at E, rather than be merely overlapped; this applies also to such joints as at A, B, C and D. The dotted lines in Fig. 14 show how these horizontal ties should be arranged between the hearth and the top of the fireplace opening. They should be anchored as shown around verticals marked N and P. The hearth should consist of a flat slab of reinforced concrete 4 inches thick, reinforced with an electrically-welded 6 by 6-inch square mesh consisting of No. 10 gauge galvanized wires. The total cross-sectional area of vertical steel at any horizontal section of the chimney or fireplace should not be less than 0.004 times the cross-sectional area of concrete; it should be placed 2 inches from the outside surface. Bars should always be placed at the corners; intermediates should not be more than 12 or 15 inches apart. The minimum diameter of the bar should be ⅝ inch; lengths of overlaps at splices should not be less than 24

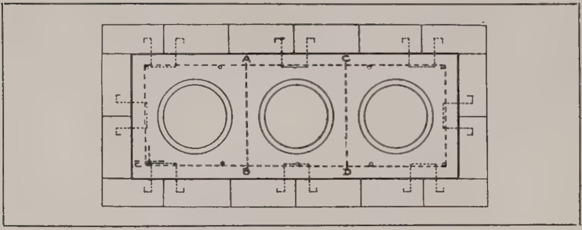


Fig. 13. Anchorage of Brick to Concrete Chimney

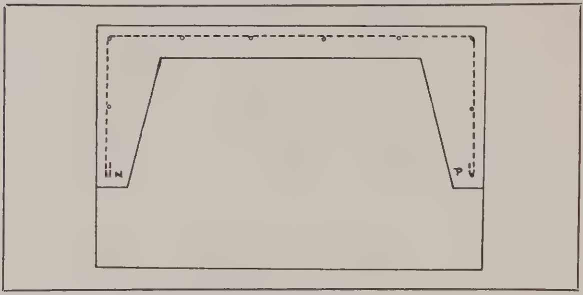


Fig. 14. Horizontal Ties in Reinforced Concrete Chimney

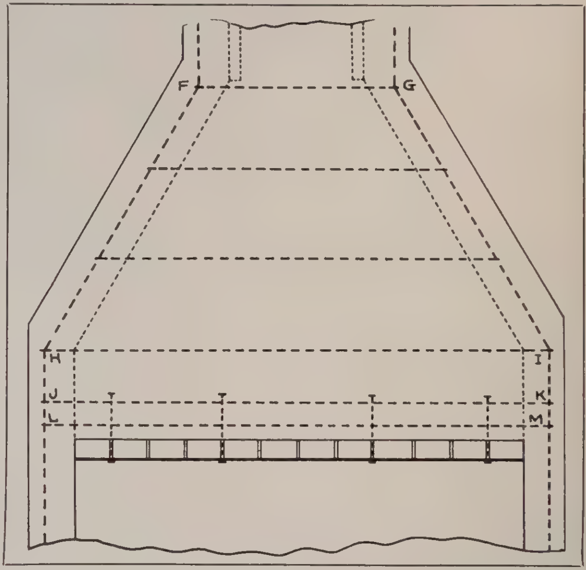


Fig. 15. Reinforcing of Chimney Throat Above the Fireplace

bar-diameters. The loops should be spaced 12 inches apart, vertically. Where the walls of the chimney are all vertical, the bars should be at least ¼-inch in diameter in one-story, 5/16-inch in two-story, and ⅜-inch in three-story chimneys. Where there is a contraction in the width of the chimney, as just above fireplaces and also between the hearth and the top of the fireplace opening, the loops should be of the same diameter as the vertical steel bars, and should be placed also just at the bends in the verticals. See loops FG and HI in Fig. 15. Two loops should be placed just above the soffit of the fireplace opening, as shown by JK and LM in Fig. 15. They will then serve also to reinforce the top of the opening. For openings of up to 5 feet in width, these should be ¾-inch square corrugated bars. In Fig. 15, the concrete soffit of the opening is protected against excessive heat by one course of brick, held in place by a steel plate extending the full width of the opening, and held as a shelf support for the brick by anchor bolts embedded at intervals in the concrete above the soffit.

Brick facings on reinforced concrete chimneys should always be anchored to the concrete by metal bonds, as otherwise the bricks will be shaken off in a severe earthquake. A device of wire is usually superior to one of sheet metal, because the latter will be destroyed more quickly if rusting occurs. Fig. 13 illustrates a method where soft steel wire of No. 12 gauge is employed. Approximately every seventh course of brick facing should be so anchored by embedding the wire in the mortar of the joint. Wherever feasible, these wire bonds should engage the horizontal or vertical reinforcement of the chimney. In any case they should have a hooked anchorage in the concrete of at least 2 inches. The ends of the bond wires should not be left straight, for then their hold in the brick mortar will be slight, but, after removal of the chimney form, they should be hooked as shown, and not merely given a right-angle bend. When, for architectural reasons, only the top of a chimney need be faced with brick, as in the case of an interior chimney, in order to avoid the earthquake stresses that are accentuated by top-heaviness, below the brick facing the concrete section should be increased to the dimensions of the composite section of concrete and facing in the top. This increased section should be maintained at various lower levels until it merges into a larger section, such as that demanded at a fireplace, for example. Special care should be taken to make the foundation area of the chimney of such dimensions that the unit pressure on the subsoil will equal that of the foundation of the rest of the house, as otherwise differential settlement will cause serious cracking in fireplaces, in interior plaster at the chimney, and injury to flashing at the roof.

In regions where earthquakes are severe, reinforced concrete chimneys should be securely anchored to wooden building frames; interior chimneys, by having the joists at each floor level framed snugly against all four sides of the chimney; outside chimneys, by strong steel enclosing bands bolted to the frame. A reinforced concrete chimney, designed and built as described here, will neither crack nor shatter in a strong shake, if it is anchored to a properly braced building on a good foundation. This contact of chimney and frame would therefore produce no appreciable increase in fire hazard, but there would be much structural benefit by preventing impacts.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 1. INTRODUCTORY

PART of the duties of the master craftsman in connection with a building operation has always been the direction of the activities of his co-workers and passing upon their work. As time rolled by and the duties of the master craftsman evolved into the more diverse functions of the modern architect, the supervision of the construction of a building developed into one of the main departments of his endeavors. Since he has elected to confine his efforts to the production of his building by means of the hands of others, it devolves upon him to see that those proxies of his are both capable and honest in the work of carrying out his true intent. He must safeguard the interests of the owner until the finished building is delivered, and must do it as well as if he were actually laboring, as of old, with his journeymen and apprentices at the site. This implies on the part of the architect, in the capacity of building superintendent, an intimate knowledge of all materials entering into the construction of a present-day building and, as well, of the correct manner of their placement. When Vitruvius presumed to set before his august emperor his famous inventory of the attributes of the well rounded architect, he could hardly have been expected to include more than a small fraction of those comprised in the attainments of the twentieth-century practitioner;—and yet the list compiled by that ancient architect was somewhat formidable.

It is, of course, humanly impossible for a single individual to know all there is to know about a building operation, from the clearing of the site to the installation of the last piece of equipment,—and yet the degree of possession of such knowledge and the amount of practical experience in its application are the gauges by which the work of the modern superintendent is measured. The owner expects and demands perfection in this office, and will be satisfied with little less. When he, with his admitted inexperience, notices defects that have escaped the keen eye of the man paid to find them, his faith in that keenness is materially lessened. Or, if later "wear and tear" bring out weaknesses that a close adherence to specification requirements would have prevented, the owner, put to serious inconvenience, perhaps to damage claims of tenants, is likely to blame the architect's superintendent more than the contractor. The latter was supposed to look to his own interests, but the architect and his representative were "well paid" to see that nothing was slighted. True, the architect has made it plain, in undertaking to supervise the work, that he is acting only in capacity of assistant to the owner in seeing that the terms of the contract are complied with and that he, most emphatically, is not taking upon himself any of the contractor's liabilities. This relieves the superintendent of legal responsibility,—but he must still shoulder the moral blame for his shortcomings, and his punishment for remissness, large or small, will be found in the attitude of the owner toward the influencing of future business in which the architect is interested. In this, whether the work be the owner's or that of others, the degree of satisfaction of the client in the way a job is supervised may be of as much as or more importance in weighing his support than that of any other item of the service rendered.

With full realization, therefore, of the importance of the responsibilities devolving upon him, a wide-awake superintendent will prepare himself to the best of his ability to meet the various emergencies that may be expected to confront him on a given work, as well as many of those that are not to be counted upon in advance.

While it is true that the dependable building superintendent is a man of experience, it is no less true that he has much to learn from the experience of others,—and at a considerable saving in cost to himself and to those by whom he is employed. Unfortunately, the booksellers offer a dearth of books on the subject, and of those in the libraries the majority are now out of print. Some of the best of these are English or continental and apply but inadequately to American conditions. Again, in all works on building superintendence, there is a tendency to combine construction design or specification writing, or both, with field supervision, thus producing a volume or volumes of more bulk than is actually needed by an outside man.

In this series of articles, the author will endeavor to confine himself to matters of most direct interest to superintendents, clerks-of-the-works, and inspectors, leaving matters of design to those in the office to whom such duties properly belong. Not that the field man is in any way independent of his indoor confreres; on the contrary, their inter-dependence is akin to that of the voussoirs of an arch, upon which the whole structure is supported. Coöperation and esprit de corps mean much in the success of a construction undertaking. The kind of superintendent who delights in picking flaws in the drawings and specifications, even calling the attention of contractors to them unnecessarily, will find himself cordially hated at the home office and should be promptly replaced, no matter how able he may otherwise be. He will eventually produce the impression, if permitted to remain, that the work of the office is untrustworthy. But that superintendent who can correct errors and iron out discrepancies with the greatest smoothness will find excellent backing from his co-workers. If his tact and diplomacy are logically extended to his dealings with contractors, his value to his employers will be limited only by his general building knowledge, experience and attention to his duties.

Of particular importance is the close relationship between the superintendent and the specification writer. The latter, if his time is entirely occupied with that work, lacks the direct touch with actual construction which is essential if he is to approximate the ideal documents which he should be striving to produce. Through the constructive criticism of the superintendent, he gets the needed practical touch, finds out wherein his clauses are weak, inappropriate or over-exacting, and can thus steadily improve his output.

The author is treating of the superintendent as of one whose entire time is devoted to such work, and will continue to speak of him in the abstract, striving to make his effort of value both to the old timer and to the beginner, and also to the architect himself who, because of choice or necessity, is looking after his outside work personally. The architect, if a young practitioner, may be as much in need of guidance in interpreting his specifications and in seeing that their stipulations are carried out as would be the case with his employe.

The thing most needing correction in many offices is slipshod, unbusinesslike procedure. As a rule, more and better records should be kept. Applied to field work, this means the inauguration of a set of rules for conducting a construction job and insistence upon close adherence to those rules. All carelessness should be eliminated, from the head of the concern down to the office boy. The modern architect may be a very fine artist,—should be if he is to arrive at the top of his profession,—but, if he is to be successful, he should, first of all, make himself a good executive. The first evidence of the lack of proper care in the administration of a job is frequently encountered in his initial dealings with his client. Either he has no contract at all or his memorandum of agreement is too vague, especially as to the amount of supervision the construction is to receive.

The form of "Articles of Agreement between Architect and Owner," published by the Illinois Society of Architects (Form No. 26, Revised March, 1923 and June, 1924) says in paragraph (e) of Article II that "General Supervision of the Work" consists of "such inspection by the architect or his deputy of work in studios and shops or at the building or other work in process of erection, completion or alteration, as he finds necessary to ascertain whether it is being executed in general conformity with his drawings, specifications and directions. In acting in this capacity his authority and status will be as defined in the 'General Conditions of the Contract' of the 'Illinois Building Contract Documents', which 'Illinois Building Contract Documents' are by reference made an express part of this agreement. He has authority to reject any part of the work which does not conform with the spirit and intent of the plans and specifications and to order its removal and reconstruction. He has authority to act in emergencies that may arise in the course of construction, to order necessary changes, and to define the meaning and intent of the drawings and specifications. He is not obliged to give continuous personal superintendence, but should the Owner require this service, the Architect will employ a clerk-of-the-works or inspector to render such assistance under his direction at the Owner's expense."

In the "Conditions of Agreement between Owner and Architect" published by the American Institute of Architects, Article 9, "Supervision of Work," reads: "The Architect will endeavor to guard the Owner against defects and deficiencies in the work of contractors, but he does not guarantee the performance of their contracts. The supervision of an architect is to be distinguished from the continuous personal superintendence to be obtained by the employment of a clerk-of-the-works. When authorized by the Owner, a clerk-of-the-works acceptable to both Owner and Architect shall be engaged by the Architect at a salary satisfactory to the Owner and paid by the Owner, upon presentation of the Architect's monthly certificates."

Clinton H. Blake in "The Architect's Law Manual" has to say on this general subject: "With respect to this whole question of the contract between the client and the architect, whether the form preferred is the Institute form or another form, it must be remembered always that the practice of every architect has certain special characteristics which distinguish it from the practice of other architects. To secure the best results, each architect should have prepared for him the form of contract which meets the special requirements and conditions of his own practice. The best use which the architect can make of these forms is not to adopt one of them bodily, but to use them as a guide in evolving the form of contract best suited to his own practice and specially prepared to meet his own problems."

This custom has been followed by the author, whose paragraph on supervision is some near variant of the following: "For the purpose of supervising the work of contractors, the Architect or his Representative will make visits to the site (or to places where material is being prepared for use in the structure) of such frequency and duration as the nature of the work in progress may necessitate and will, during such visits and by means of correspondence and interviews between visits, use his best endeavors in properly instructing contractors in the work to be done and seeing that they correctly fulfill the terms of their contracts and maintain an effective going organization of all engaged upon the work. The Architect will pass upon the merits of materials and workmanship, audit contractors' accounts, prepare estimates of cost of original work and proposed alterations, issue orders for changes sanctioned by the Owner, give certificates for payments to contractors, and generally assist the Owner in enforcing the terms of the contracts; but the Architect's supervision shall not include liability for any breach of contract by a contractor, nor is the architectural service, under this contract, to include any of the duties ordinarily considered as belonging to a builder or contractor, nor shall such supervision be construed to mean the continuous oversight of a superintendent or clerk-of-the-works. The Architect reserves the privilege of recommending the continuous employment of a clerk-of-the-works for such period of the construction as he deems advisable and at such remuneration as may be approved by the Owner; such employe to be on the Architect's payroll and his pay billed to the Owner and paid for by the Owner in addition to other sums due the Architect. But the employment of such clerk-of-the-works will not relieve the Architect from the performance of his duties as above set forth nor tend to lessen his responsibilities in supervision."

In the last analysis, the Owner will, of course, get whatever supervision from the Architect the latter considers the job is entitled to receive and that he is in position to afford. The point is that he and the owner shall understand each other on the subject, and that the latter shall not expect too much. The suggestion of the employment of a clerk-of-the-works contained in the form given above has been found to take care of this point quite efficaciously. In this, as in all other matters touched upon, we assume that the architect is of the ethical type who has always at heart the best interests of the work upon which he is engaged.

Inasmuch as there is a wide divergence in the method and personnel used in handling supervision in the offices of architects, it is advisable that we adopt certain arbitrary designations and expressions which are readily understood, though they may not be current in some localities or in all offices in any locality. In a general way, we shall treat of the supervision of all operations incidental to the construction and equipment of a million-dollar high school, situated in an ordinary town or small city, and in the customary somewhat isolated location. This is a comparatively simple engineering and construction problem, fairly typical, and will bring out some phase of each of a superintendent's duties and many of his worries.

The architect is assumed to be living in another city and making fortnightly visits to the work. His duties are thus supervisory, the actual superintendence being performed by a clerk-of-the-works whom, for convenience, we shall call the superintendent. He gives his entire time to the work and is paid by the architect who, in turn, assesses the wages and other expenses of supervision against the owner, to be added to the architect's fee, as is the best approved practice.

For clarity, we shall from time to time use diagrams and excerpts from the specifications, but all building drawings are purposely omitted in order that we may not become too specific on various subjects. For the same reason, we shall take occasion to digress from the particular building we have under consideration, as may appear advisable.

Of prime importance to a superintendent who finds himself at a distance from the home office is an intimate, definite knowledge of the methods in vogue with his employer. He must know, as nearly as may be, just what is expected of him day by day during the entire progress of the work. To this end, nothing is more helpful than a carefully prepared set of instructions. It is invaluable to a novice and scarcely less so to the older head, even if the work under construction is not remote. It will save a lot of conversation, correspondence and other lost motion;—it will also deprive the superintendent, perchance, of some otherwise convenient "alibi"!

CHAPTER 2. THE DUTIES OF SUPERINTENDENTS

THE instructions in this chapter are a composite of those prepared for four different architects' offices. They contain the gist of the rules of procedure needed by a new man going to his first job or by an older man under a new employer. Much that is contained in these instructions is obvious, but its reiteration will serve to emphasize its importance. No such rules can be sufficiently comprehensive to meet all conditions that may arise. Perhaps in no other field, therefore, is the training of an experienced man of more immediate value. He must not only be possessed of proper initiative, but must have sufficient confidence in himself and his judgment to take a positive stand when occasion requires. A man who changes his mind frequently, reversing his rulings under pressure, has no place in this important office. Of course, if he has made a mistake and is manifestly wrong, he should not be so "bull headed" as to refuse to back down; but too many such mistakes will pointedly demonstrate his unfitness for the work.

A talkative superintendent is less valuable than one who is aloof or taciturn. One who makes himself agreeable without being unduly sociable is ideal, other things being sufficiently to his credit. He is there to see and understand everything that goes on, but not necessarily to talk about it. Tact is his chief asset, next to his knowledge and experience. This means, among other things, that all criticisms and adjustments are to be taken up with the contractor himself or his chief representative on the job and not, except in case of emergency, with any subordinate. Nor should a contractor or foreman be censured to his men or in their presence. The superintendent is to promote a smooth-running job and must avoid creating disturbance or unrest. A novice in this position must guard against being either too timid or too eager to show his authority. For this reason, he should not have too much authority vested in him until he has outgrown his novitiate. It is easy to say: "Tear that down; it's all wrong," but nothing will disrupt an organization more quickly. If one sees masons laying a wall 12½ inches thick with no mortar in the longitudinal joints when the drawings call for a 13-inch wall and the specifications say that "all joints shall be slushed full," it is easy to take the foreman to one side to discuss it with him and give him opportunity to move his men to another point until a decision has been made. The architect may take note of the fact that this particular piece of basement wall is merely a curtain wall and may not be particular about it; or he may decide that, because too much of it has been laid to make it a simple matter to have it razed, it is expedient to compromise with the contractor on the basis of a contract-price deduction. But the creation of an uproar on the job should be avoided by all means, if possible.

Every experienced architect and superintendent knows, however, that too much temporizing or compromising with contractors on a job is not good for it. Some superintendents are too accustomed to want to "trade" with a contractor here and there as the work progresses. It is easy to acquire this habit, and it is equally easy to allow the habit to grow into a serious evil. Particularly is this true when it comes to a matter of rectifying the architect's mistakes or those of his employes. He will find the contractor quite ready to curry favor by offering to make a correction at his own expense in exchange for some privilege, the which actually causes the innocent owner, in the final analysis, to pay for the shortcomings of the architect. That architect who is as prompt to admit his own errors, and to pay for them if need be, as he is to call attention to those of the other fellow, cannot fail to win respect thereby.

All these pertinent facts, and many more are in the back of the brain of the older head,—learned, he might say, in the "school of hard knocks," and ready to be applied as opportunity offers. Definite instructions can only be general, but a superintendent is entitled to something of the kind that will serve to acquaint him with the custom of the particular office in charge of the job. Architects just starting independent careers might advantageously copy the following instructions, condensed or augmented as deemed advisable. Something of the sort should also be adopted in offices where definite rules have hitherto been lacking.

INSTRUCTIONS TO SUPERINTENDENTS

1. *Classifications of Construction Superintendents.* This office employs three types of Superintendents, each of whom shall report directly or indirectly to the Chief Construction Engineer:—

A. "Superintendents-in-charge" shall be the only men supervising construction who are entitled to be called "Superintendents." They will be in complete charge of major work under their jurisdiction, empowered to interpret drawings and specifications, issue orders and to make use of the firm's signature (with certain restrictions), but are not authorized to order other than minor changes, nor any changes involving additions to or deductions from the contract price. Superintendents report directly to the Chief Construction Engineer, will be in charge of one of more jobs and will, in each case, have one or more inspectors assigned to assist them.

B. A "Clerk-of-the-works" is employed to supervise certain operations as an observer only, is not authorized to issue orders or to make use of the firm's signature, except when particularly authorized to do so by the Chief Construction Engineer, to whom he reports direct.

C. The duties of an "Inspector" are similar to those of a Clerk-of-the-works, except that an Inspector receives orders and reports to the Superintendent-in-charge and not directly to the Chief Construction Engineer. The use of the firm's signature cannot be delegated to an Inspector.

The following instructions are intended primarily for the guidance of Superintendents and Clerks-of-the-works. Inspectors shall also familiarize themselves with these instructions and shall follow such as are applicable to their duties.

2. *Job Classification.* The operations out of this office are classified as "Major" and "Minor"; "New Work" and "Alterations"; and as "Local" and "Out-of-Town." Supervisory duties vary accordingly.

A. A Major Operation is one on which the Superintendent has one or more Inspectors assisting in the supervision.

B. All other operations are deemed "Minor."

The Chief Construction Engineer will determine the status of each job and make his assignments accordingly. He will also advise Appointees of any special duties or exceptions not in accordance with these instructions, which latter will otherwise apply in full force, without exception.

3. *Preliminary.* Immediately upon being assigned to a job, the Appointee must ascertain its classification, exact location and the time set for his first visit. He will, if feasible, be allowed from a day to a week in the Home Office, before going to the job, in which to familiarize himself with all phases of the work. When such time allowance is impracticable, he must take the first available time to accomplish this. He has no limiting working hours, but must use whatever time is needed for the performance of his duties, keeping always at least "one jump ahead" of the work on the job. He will be supplied with complete specifications and working drawings (including details and shop drawings) and a copy of the contract; also all addenda and special orders and correspondence affecting them. He will be provided with a suitable container in which he shall keep all prints and other documents pertaining to the work, including a complete file of job correspondence, for all of which he will be held individually responsible. If warranted, he will be permitted to requisition an office desk, chair and typewriter; also additional necessary equipment when a stenographer or other clerk is assigned to him.

4. *Working Drawings and Specifications.* The Appointee must make sure that his set of drawings and specifications is of latest issue and complete for all contracts. He must give both a thorough check, one against the other, as the best method of familiarizing himself with all documents. This will necessitate reading the contract and specifications,—every word, including the general conditions, printed or typed.

Notes must be made of apparent discrepancies, errors or other features not perfectly clear and each point be carefully set forth in a letter to the Home Office, except that matters of lesser import may be checked over with the Chief Construction Engineer as opportunity offers. But no such matters should be allowed to drag. They should be settled promptly, orally or by letter, and record made accordingly, corrections pertaining to drawings being noted thereon in ink or colored pencil.

5. *Contracts.* The Appointee must make careful note of all provisions of all contracts and the general conditions directly affecting the initiation of the work, such as:

A. Securing permits.
B. Soil tests. Boring or other records, if any.
C. Time limits. Schedule and Penalties.
D. Insurance, all kinds.
E. Bonds, if required.
F. Provisions for extras and overtime work.
G. Provisions for "force-account" or "cost-plus" work.
H. Provisions for union labor, if any.
I. Contractors' statements and methods of payments.
J. List of Subcontractors and how approved.
K. Provisions for shop drawings, samples and models and their approval.
L. Progress photographs, how many; when.
M. Provisions for laying out of the building.
N. Provisions for protecting property adjoining, if needed.

6. *Survey.* The Appointee must secure a copy of the survey, if one has been used, and see that the plans are in conformity therewith. He must definitely ascertain the relation between existing grades and datum and get the location of bench mark, if any has been established; if it has not, find out how it is to be established and see to it.

7. *Shop Drawings, etc.* He must secure copies of all approved shop drawings and make arrangement for future issues to reach the job promptly, both for the use of contractors and himself. He should not hesitate to keep the Home Office reminded that certain shop drawings are due or overdue. Such insistence may prevent avoidable delays. The same is true of approval of samples and models, as well as catalogs and manufacturers' specifications, to which reference has been made in the job specifications. Copies of all such must be on file in the job office while work is under way.

8. *Building Codes.* He must secure, or have access to, a copy of the city or state Building Codes (or both, if there be such) governing local conditions and give himself a working knowledge of them, as far as applicable.

9. *Office Blanks.* He must requisition such of the following stationery as will meet his job requirements:—

A. Office letterheads.
B. Envelopes; large, small and self-addressed.
C. Departmental correspondence sheets.
D. Carbon sheets.
E. File copy sheets.
F. Report blanks; daily, weekly and monthly.
G. Telephone record blanks.
H. Box files.
I. Scratch pads.

Note that the scratch pads are intended to save wasting other stationery and marking on blueprints, both of which are to be avoided.

10. *Job Duties.* It is assumed that the Appointee arrives at the site either before or shortly after the excavating has commenced. If not, he will take up his duties at the stage of progress at which he finds the work and make such inspections as are necessary to place himself in command of the situation, thereafter devoting such time to it as is required or allotted. His general duties are to see that the job goes forward according to schedule (or better), that contractors understand the drawings and specifications, and that they honestly carry out the terms of their contracts. Specific duties are such as may be directly assigned by the Chief Construction Engineer. Both duties shall receive the best attention of the Appointee.

11. *Reports.* Report blanks shall be filled out fully and clearly, daily, weekly and monthly, as directed, always regularly and promptly, so that the Home Office can "see and hear" exactly what is going on. The Superintendent is the eyes and ears of the Office. He must be especially forehanded in anticipating potential causes of delay and doing what he can to remove them; being particularly alert in citing all such in his daily reports and "jacking up" the Home Office if it appears probable that the negligence of someone there may later serve a contractor as an alibi,—alleging lack of coöperation in that quarter. Percentage progress reports shall be made at such intervals as decided by the Chief Construction Engineer and in such form as he may direct.

12. *Mail, Telephone and Telegraph.* Upon arrival (if possible, within the first 24 hours) the Appointee must call at local telegraph and long distance telephone offices and arrange for messages to reach him. For local calls, he will use the job telephone, unless otherwise directed by his Chief. He must secure a permanent mail address, preferably a P. O. box or at his hotel or rooming house, if the latter is not too distant for two daily deliveries. Provision should also be made for receiving special delivery mail at the job office, but it is not good practice to have other mail sent there. Too many have access to it, and it is too easily lost or misplaced. Mail must never be addressed or received in care of a contractor.

13. *Signs.* It is customary for the firm's sign to be located on the premises along with that of the contractors. The Chief Construction Engineer will confer with the general contractor as to how this is to be done. No sign or advertisement may be erected without the Chief's special consent.

14. *Expense Accounts.* Each employe is entitled to an expense account when away from the office on the firm's business. Such account shall be kept carefully, day by day, and may include these items, actually paid out:

A. Traveling expenses, including night Pullman fares.
B. Street car fare and, in emergencies, bus and taxi fares.
C. Hotel and restaurant bills, including only the first day on jobs requiring residence of six days or more.
D. Ordinary tips in connection with the foregoing, not in excess of 10 per cent on any item.
E. Telegraph and long distance telephone calls, only where record of them is on file. Telegrams to the Home Office should be sent collect; all others prepaid.
F. Local telephone calls.
G. Only such other expenditures as are specifically authorized by the Chief Construction Engineer.

Expense memoranda must be sent to the Home Office at regular intervals, as arranged.

15. *Correspondence.* Carbon copies of all outgoing letters must be kept and filed, using separate files for Home Office correspondence and for outside correspondence. All letters received must be similarly filed. Confirmation by letter of all important telephone conversations must be made a habit, the Superintendent either writing them on the blanks provided or insisting upon the other parties' doing so. If an explanatory sketch is sent out with a letter, carbon copy of the sketch must be filed with the letter copy. Copies of orders issued to Contractors modifying contract terms must be attached to the job copy of specifications. In case such orders affect the contract price, a notation to that effect must be attached to the job copy of contract.

16. *Revised Drawings.* Preliminary prints sometimes are issued for the purpose of starting excavating or foundations before all working drawings are finished or revised. When these or later issues are superseded by revised prints, the Superintendent must take careful note of all changes and their effect upon the work already done, as well as that to be performed, and must see that the contractors also have a clear understanding of it. He must also exercise due caution to see that all superseded prints are marked "void" and not left where they might cause trouble.

Editor's Note. This is the first of a series of articles covering in detail the duties, procedure and problems of the architectural supervision of building operations. Realizing the present lack of a definite and adequate treatment of this subject, Mr. Beach has prepared this thorough and informative treatise, based on his many years of active experience and observation. In the February issue, Mr. Beach will continue the "Instructions to Superintendents," and will take up the matter of superintendents' reports, etc. The articles will treat authoritatively of every phase of the work of building supervision for architects and their representatives.

STANDARDIZATION

AS APPLIED TO THE COMPILATION OF WORKING DRAWINGS

BY

E. L. NORBERG

CHAIRMAN OF THE STANDARDIZATION COMMITTEE OF THE NORTHERN CALIFORNIA CHAPTER, A. I. A.

THE architectural profession has in the past been generally criticized, and sometimes justly, for being impractical and lacking in business ability to such an extent that so-called architectural construction companies with their advertised staffs of experts have been securing a large part of the architectural business. So, with the object of promoting the "scientific and practical efficiency of the architectural profession," the Standardization Committee has worked out a number of practical ways and means of standardizing, simplifying and assisting to make more accurate, complete and systematic the architect's office work and, through the use of standard symbols and scientific methods to eliminate wasted effort in the drafting room and to materially assist in the compilation of more accurate and complete working drawings, so that guessing by estimators and extras on the project will be eventually eliminated.

A tentative set of "Standard Symbol Sheets" have been drawn up and consist of:

A. A Standard Symbol Sheet of architectural notations, including abbreviations.

B. A Standard Sheet of Symbols for plumbing work (developed in connection with the Master Plumbers' Association).

C. A Standard Symbol Sheet for heating, ventilating and mechanical equipment.

D. Revisions of the present Standard Symbol Sheet for electrical wiring.

In addition to these symbol sheets, an "Architect's Office Sheet" showing the simplest and yet the most complete manner of indicating different items, schedules and other data not contained in the Standard Symbol Sheets, has been compiled. These sheets have been approved by the Northern California Chapter of the A. I. A., and they were presented at the last national convention of the A. I. A. with the idea that eventually they will be adopted throughout the entire country. In compiling the symbol sheets every effort was made to select symbols that were already in general use and are understood and would be least likely to lead to confusion or misinterpretation. After the final approval of the symbol sheets they will be distributed to all architects of the Institute and in turn to the various engineers, contractors, estimators, etc., down to and including foremen.

Advantages of the Symbol Sheets are that:

A. All architects of the A. I. A. will use the same symbols and notations on their plans, which will be of great assistance to all estimators, contractors and foremen who work with many different architects' plans.

B. Draftsmen will learn the standard symbols and methods, and in moving from one architect's office to another will not be confused as at present, and as a consequence time will be conserved, errors eliminated, and better plans produced at less cost to the architect.

C. It will no longer be necessary to draw a set of symbols and abbreviations on each set of drawings as it is at present. A note will simply say that all symbols and abbreviations are according to A. I. A. Standard Sheets.

In connection with this, model plans embodying these features, will be obtained from the various architects and exhibited for educational purposes. The sheets as at present published are more or less tentative, and it is hoped that architects will study them carefully; any comment or constructive criticism is invited.

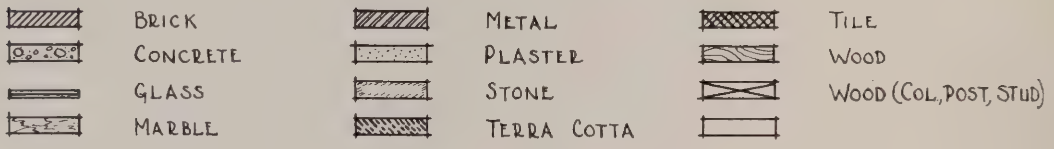
Sheet "A," on architectural notations and abbreviations, is simply a compilation of data as generally used. Sheet "B," on plumbing, was compiled in connection with the Master Plumbers' Association, and its coöperation and assistance were of great help. Sheet "C," like Sheet "A," is a compilation of generally used symbols, and suggestions from the engineering societies will be appreciated. Sheet "D," on electrical symbols, was compiled some time ago by the electrigists and approved by the A. I. A. and has been generally adopted. Only some additions and changes are required. The chief change is in using the figures 2, 3, 4, 5, 6, 7 and 8, which are substituted for the characters that formerly were marked on tap circuits to indicate the number of No. 14 conductors in ½-inch circuits. The "Architect's Office Sheet" is tentative and requires considerable thought and additional data on structural work to make it practical. In addition, this Committee is working out a number of other matters pertaining to drafting room efficiency.

Editor's Note. Constructive criticism of the tentative standards reproduced herewith is cordially invited. It is hoped that not only will there be suggestions in regard to the Symbol Sheets here mentioned, but that other such sheets covering other subjects may be developed and submitted for consideration. All communications may be addressed to The Architectural Forum.

SYMBOLS FOR ARCHITECTURAL & STRUCTURAL DATA

MATERIALS IN SECTION.

NOTE:
Old materials Same only Shaded.



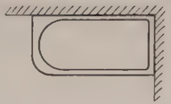
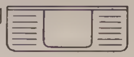
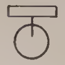
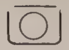
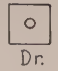
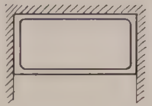
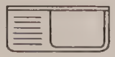
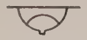
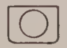
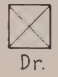
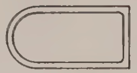
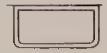
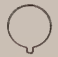
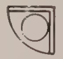
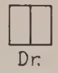
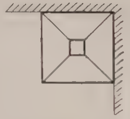
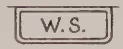
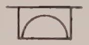
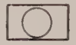
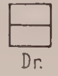
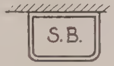
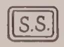
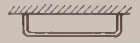
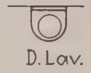
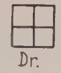
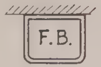
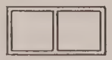
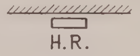
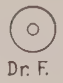
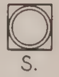
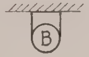
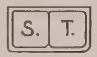
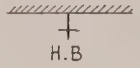
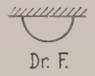
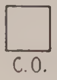
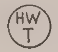
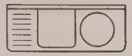
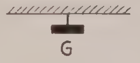
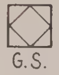
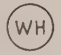
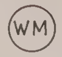
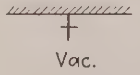
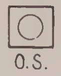
ABBREVIATIONS

Basement	Bsmt.	Mirror	Mir.
Black board	B.B.	Mullion	Mull.
Bulletin Board	Bull. B.	Muntin	Munt.
Cabinet	Cab.	Natural Grade (Pres).	Nat.(Pres)Gr.
Canvas Covered	Can. Cov.	Not in Contract	N.I.C.
Casement	Csmt.	On Centers	O.C.
Cast Iron	C.I.	Panel	Pan
Ceiling	Clg.	Patent Hardware	Pat. Hwd.
Cement Plaster	Cem. Pl.	Picture Mould	P. Mld.
Center Line	℄	Pine - Oregon	O.P.
Closet	Clos.	Sugar	S.P.
Concrete	Conc.	Plaster	Pl.
Cooler	Cool.	Redwood	Rwd.
Cornice	Corn.	Riser	R.
Door	Dr.	Sash Door	Sh. Dr.
Double Hung	D.H.	Screened	Scr.
Down Spout	D.S.	Sheet Metal	Sh. Met.
Drawer	Dwr.	Shelf and Rod	Sh. & Rd.
Finished Grade	Fin. Gr.	Side Light	S. L.
French Door	Fr. Dr.	Sliding Door.	Sl. Dr.
Galvanized Iron	Galv. I	Stationary	Stat.
Glass - Cathedral	Cath. Gl.	Steel	St.
Clear	Cl. Gl.	Studs	Stds.
Leaded	Ld. Gl.	Telephone	Phone
Obscure	Ob. Gl.	Terra Cotta	T.C.
Plate	Pl. Gl.	Thimble	Th
Wire (Polished, Rough)	W. Gl. (Pol., Rough).	Threshold	Thr.
Hardwood Floor	Hwd. Fl.	Tongue and Groove	T&G
Ironing Board	I. B.	Transom	Trans.
Jamb	Jb.	Treads	Tr.
Keene Cement Wainscot	K. Cem. Wains.	Veneer	Ven.
Leader	Ldr.	Wainscot	Wains.
Linoleum	Lino.	Window	Wnd.
Magnesite	Mag.	Wood Base	Wd. B.
Medicine Cabinet	M. C.	Wood Stair	Wd. St.
Metal Covered	Met. Cov.	Wrought Iron	W. I.

SHEET A

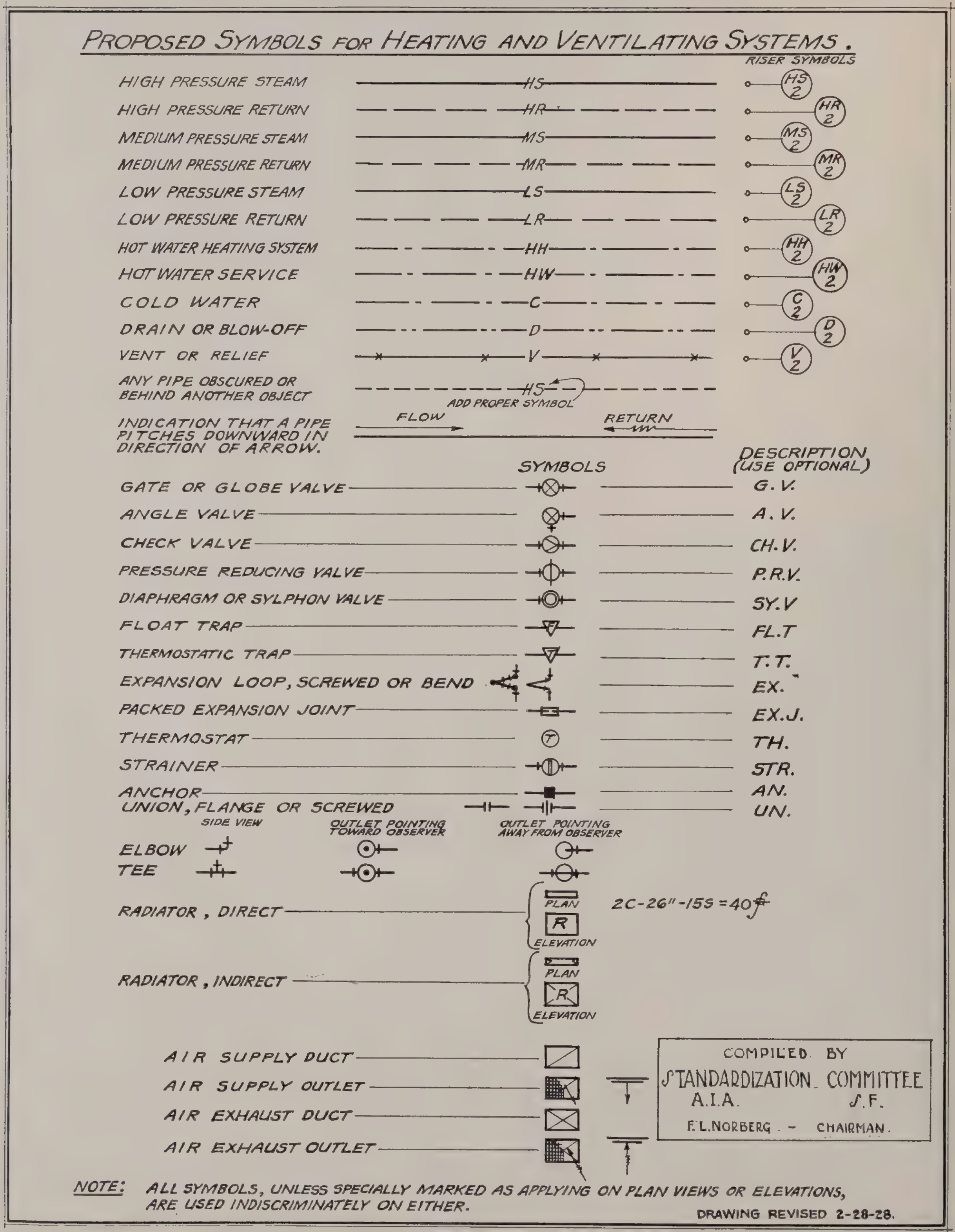
TENTATIVE STANDARD SYMBOLS FOR ARCHITECTURAL NOTATIONS, INCLUDING ABBREVIATIONS

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

SYMBOLS FOR PLUMBING FIXTURES								DRAIN SYMBOLS	
CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN	CHARACTER	PLAN
Corner Tub		R. & L. Drain Board Kitchen Sink		Water Closet		Pedestal Lavatory		Floor Drain	
Built in Tub		L. Hand Drain Board Kitchen Sink		Wall Urinal		Wall Lavatory		Shower Drain	
Roll Rim Tub		Plain Kitchen Sink		Pedestal Urinal		Corner Lavatory		Garage Drain	
Shower Stall		Wash Sink		Stall Urinal		Manicure Lavatory		Floor Drain with Backwater Valve	
Sitz Bath		Slop Sink		Trough Urinal		Dental Lavatory		Refrigerator Drain	
Foot Bath		Laundry Trays		Hose Rack		Pedestal Drinking Fountain		Roof Sump	
Bidet		Combination Sink and Tray		Hose Bib		Wall Hung Drinking Fountain		Clean Out	
Hot Water Tank		Combination Sink and Dish Washer		Gas Outlet				Grease Separator	
Water Heater		Washing Machine		Vacuum Outlet		Scale of Symbols $\frac{1}{4}'' = 1' - 0''$		Oil Separator	

SHEET B

TENTATIVE STANDARD SYMBOLS FOR PLUMBING WORK



SHEET C

TENTATIVE STANDARD SYMBOLS FOR HEATING, VENTILATING AND MECHANICAL EQUIPMENT

Compiled by the Standardization Committee of the Northern California Chapter, A. I. A.

EFFICIENT PROCEDURE IN BUILDING

BY

MORTON C. TUTTLE

PRESIDENT, MORTON C. TUTTLE CO.

IN any field of enterprise, new methods and procedures are usually looked upon as visionary and impracticable, and in a field so fiercely competitive as that of the building industry, this would certainly seem to be the case. In the present paper I propose, it is true, to advocate new methods and procedures, but I submit them on the basis of practical experience of their effectiveness. The building industry has been and in fact still is conducted on the basis of competitive, lump-sum bidding. Yet one firm, which has refused to conform to this accepted method,—that is, to compete on a price basis for any contract,—has been satisfyingly successful in convincing discriminating clients that the methods herein discussed assure them genuine economy and satisfaction in their building and engineering operations. The firm departed from the established procedures of the trade because it believed that the theories upon which the building business has been conducted,—and more especially the procedure of competitive bidding,—have resulted in conditions and practices which are undesirable; and further, that they tend toward waste and extravagance, rather than toward economy and satisfaction. Let us, for a moment, consider certain facts regarding the building industry.

That building is hazardous business is a matter of common knowledge. No bank, for example, wishes to carry a large number of building trade accounts because of the notoriously bad credit risk. The Secretary of the Associated General Contractors of America says that failures among general contractors average 10 per cent a year; that is, in every period of five years one-half the companies engaged in general contracting fail. We need not here consider the economic evils inherent in such a state of affairs; we wish rather to consider the effect upon the contractors themselves,—those left in the field,—of a continuing economic slaughter of this kind.

Theoretically,—and practically,—a field of business in which one-half the competitors sink from sight every five years offers to the struggling survivors the constant threat of financial failure. In the competing and harassed building trade, the subject of price is emphasized from daylight to dark, year in and year out, and with the necessity for low cost constantly reiterated by architects and engineers,—and grimly illustrated by the failure of those who cannot pare costs to the quick,—it is small wonder that the building field is obsessed by the idea that only in the making of low costs,—at any cost,—lies success.

The building industry in general is conducted upon the theory that the architect or engineer shall design and specify in exact detail the building or engineering work which the owner has in mind. His plans and specifications are submitted to general contractors, who are prepared to bid,—lump sums,—for the complete contract. The contractor whose bid is accepted will then undertake to execute construction or engineering work of the exact sort which has been minutely described in the plans and specifications. It is assumed that the architect or engineer will then see to it that a building of exactly the quality and of exactly the kind specified shall be constructed. This necessity for safeguarding the owner's interests is based on the theory that a contractor who has been in snrewd competition on price for the contract may, —in case of adverse conditions,—be tempted to substitute less satisfactory material and workmanship than that which has been agreed upon. It is unnecessary to amplify the fact that any industry in which the chief emphasis is placed on price cannot offer great assurance for frankness of dealing.

The evils of this condition, furthermore, are becoming apparent to the contractors themselves. Many of the best men in the construction field now hesitate to accept the duties of superintending and managing work obtained on a fixed-price basis. They declare openly that in order to make a fair profit on work obtained in price competition they are forced to sharp practices. They realize, furthermore, that their abilities are confined to low-cost building, rather than to building in which they can take legitimate pride. They even admit that, carried to its extreme the competitive building business requires them to dissemble, to evade, to answer with partial truths, and to deal with their subcontractors on the basis of *caveat emptor,* rather than on any basis of equitable coöperation.

This state of affairs is, in our opinion, due solely to the pressure resulting from competitive bidding. The evils inherent in the old system are, as I have said, beginning to be recognized. In the desire to get away from the hazards and evasions of lump-sum bidding, many firms are developing new methods of obtaining work. A common device is combining a building company and an engineering department with the management of public utilities. Under such an arrangement, the consolidated company can turn over to its building department a considerable volume of business on any form of agency contract it pleases. Another means of avoiding the rigors of lump-sum bidding is the combination of financing and building business. With direct ownership in the property, a builder can secure work without lump-sum competition.

There are, of course, certain companies which prefer the old method of competitive bidding. Investigation generally proves, however, that these are companies which, through special personal or business affiliations, are not subjected to the full force of price competition, and which can therefore obtain contracts at a good margin of profit. The only genuine enthusiasm for the competitive bid comes from individuals who, by chance or through some special advantage, have obtained contracts at abnormally high prices. When a contract is awarded on a high bid, the contractor is naturally free from all responsibility as to its actually representing a fair price,—fair, that is, to the owner. The extra profit is all the contractor's, and by that much he is in luck. But to fulfill a contract on a fixed bid always involves the element of risk. A friend of ours, who for years was insistent that lump-sum bidding offered the only satisfactory method of conducting a business, was wiped out by unforseen conditions.

Our inquiry into the procedure of the competitive bid confirmed us in the belief that not only is lump-sum bidding to the disadvantage of the contractor, but that it is, furthermore, greatly to the disadvantage of the prospective owner. As a matter of fact, rarely are the actual desires and needs of the prospective owner in the proposed building fully ascertained. The average owner does not always desire or need the precise building described by a given set of plans and specifications. What he does desire is a building approximately like that specified and planned. He has explained what he thinks he wants,—as clearly as he is capable of doing,—to his architect or his engineer, and he accepts,—hopefully or not,—the plans or specifications presently submitted to him as the best compromise he can obtain. Yet any given set of plans rarely represents the crystallization of the prospective owner's needs and desires. On the contrary, they often represent the results of uncertain thinking, faultily explained to the technician, who in turn translates those somewhat hazy ideas into the foreign language of blue prints and specification, and thus embodied submits them to the bidders, who do not dare to criticize the work of the designer, and whose business it is simply to name the prices,—the lowest prices,—at which they dare to attempt to fulfill the contract.

In the satisfaction of his every-day needs and desires, the prospective owner is accustomed to determine his selection on the basis of value and quality, and in most matters he has some experience or some means of comparison. In building he has perhaps little experience and small means of comparison. He ardently wishes he knew enough about engineering or architecture to judge how much included in the plans is necessary or unnecessary for his purpose. He wishes he knew the precise cost of this or that detail, and what the result of a change or omission would be. He wishes he knew, in terms of cost, what other details besides those shown on the plans are available, for he must consider not only the immediate cost of construction, but the cost of upkeep and necessary alterations: He would like to know if simpler and less expensive methods might not be equally satisfactory. He would like to be able to determine whether the architect and the engineer have added certain details from pure pride of craftsmanship, for, although he may believe his architect or engineer to be an ingenious technician, he is not quite sure that any technician thinks in terms of cost; and he is acutely aware that it is he himself who must produce the money, and later on pay for the upkeep of the building.

Upon such matters the owner can, of course, consult the architect or engineer, but these agents rarely possess a thorough knowledge of current costs, nor do they always base their judgments upon considerations of cost and utility.

Cost knowledge, however, is the stock in trade of the general contractor; an accurate and complete knowledge of costs is the basis of his reckoning. He must know the cost of details, he must know which method is the most economical, and he has shrewd ideas as to the earning value of this, that, or the other equipment. The best of the general contractors also maintain competent engineering departments. These departments are composed of men thoroughly expert in their lines of work, who of necessity have the idea of economy constantly in mind. If they cannot produce economical work, they have no value to the general contractor. But the general contractor, with his sound knowledge of cost and value, cannot go to the owner with suggestions as to changes in plan, even though those changes might save the owner a substantial sum. The contractor is frankly afraid that he may make enemies of the architect and the engineer,—and they are the sources of his business. An owner is infrequently in the building market; the architect and the engineer are continuously in it, and they are the last individuals the contractor wishes to antagonize.

This situation raises a barrier between the owner and the contractor,—the individual who is perhaps best equipped to give the owner the detailed information he desires as to cost and value. As a result of this state of affairs, the buying in the building trade is done almost wholly by the architect and the engineer, as agents for the owner, and like any agents they are likely to safeguard their stewardship by buying as cheaply as they dare and awarding their contracts at as low a price as they can.

One contracting firm instituted its business in the belief that if it were unhandicapped by the rigidity of the competitive bid, its experts could study the owner's requirements and coöperate with him, and his architect or engineer, in the selection of the most suitable solution, by showing him the detailed cost of various methods of fulfilling those requirements. It believed that the translation of the details of the problem into terms of dollars and cents would result in producing more economical designs,—a premise which, again and again, has proved to be correct.

Present-day specialization in the many processes of building confirmed the belief that some form of coöperation is essential. It was observed, for example, that the general contractor is himself a buyer for a large part of his operation. In the old days he used to be a mechanic,—usually a carpenter or a bricklayer,—who with his own workers constructed the entire building. As building grew more complicated, subcontractors came into the field, until today there are some 30 subcontractors engaged in the construction of a modern office building. It was found that the general contractor sub-lets some 70 per cent of his work, and that half the remaining 30 per cent is accounted for by the cost of materials which the general contractor uses for his own operations. This means that the general contractor's payrolls on an ordinary office building amount to about 15 per cent of the cost;—that is, for 85 per cent he is buyer of materials and subcontracts.

The contractor can obviously only estimate on all these subcontracts in the total bid which he submits to the prospective owner or the architect. If he has over-estimated and still is awarded the contract, he gains and the owner loses. If he under-estimates, he will certainly be tempted to try to make up his loss by skimping somewhere. It seemed that some method could be devised whereby value rather than merely cost should be the basis of selection,—not only in the individual subcontract but in all purchase of material. It was felt that as the general contractor is the expert,—and probably the only expert,—on cost and values, rather than submitting to the owner and architect a hit-or-miss lump-sum bid, he could be of greater service as their agent and adviser in estimating the relative values of methods and materials. It is clear that if the maximum value in all materials and subcontracts is obtained, the owner will receive maximum value in a building completed without unnecessary delay. This has been proved in practice.

There is another factor of very great importance to the owner, which can be gained only through coöperation with the general contractor. As any large piece of construction progresses, improvements on the original plan may suggest themselves, and opportunities for economy arise. Seldom can an engineer or architect visualize a problem in its entirety months before the details of the operation are actually under way. In constantly studying his problem, in obtaining the ideas of the person engaged upon it, and in the acquired experience of the owner, there arise opportunities for improvement and for economies over the plan which was originally considered.

In dealing with a lump-sum bidder, the architect or the engineer properly hesitates to make a change in his plans and specifications, even though such a change be an obvious improvement and economy. He dreads any change in the original plans because of the difficulty of securing a fair adjustment of cost. On an omission the general contractor allows as little as possible; on an addition he charges as much as he can, and there is seldom a possibility of assuring the owner that the adjustment is fair. The total cost of even a few minor changes usually rises to an amazing total. The architect, accordingly, prefers to allow even a crudity embodied in the plans to remain uncorrected rather than face the perils of adjusting its cost with the lump-sum contractor.

Such desirable changes, however, are easily adjusted by the general contractor who is acting in coöperation with the owner. It should be noted that opportunities for desirable alterations usually occur not in the work handled directly by the general contractor, but in that of the subcontractors. Now the subcontractor looks to the general contractor for his business, precisely as the general contractor looks to the architect or engineer. The subcontractor is, therefore, very ready to coöperate with the general contractor. As the general contractor is responsible to the owner for the final cost, he will see to it that only a fair charge is allowed for any changes. Under the system of competitive bidding, however, the general contractor is likely to be entirely complaisant if a hard driven subcontractor gets a chance to pick up more profit. He is quite likely to feel that the owner, through his architect, has driven a hard bargain with him, and that it is little concern of his to decrease the burden of the extras. Incidentally, the general contractor usually receives a percentage of extra costs. It is not a situation that inspires much hope of sympathetic handling. The owner has dealt through an architect dealing with a general contractor, who in turn is dealing with a subcontractor. So, the owner can pursue the sequence of events down to one certain answer,—which is, that he pays.

The firm therefore concluded that if, in addition to a reputation for frankness, honesty and ability as contractors, it could establish a reputation as buyers and managers, prospective owners would employ it because of that reputation, with the assurance that they would receive sound work at a fair price. Owners have been found very sensible of these financial benefits, and, contrary to general belief, many architects and engineers not only do not resent this procedure, but eagerly welcome it and coöperate in it. This coöperation of prospective owner, designer, estimator and constructor obviously produces economy. In practice these economies are greater than would be at first imagined.

Once convinced that this procedure was logical and that the theory by test adapted itself to practice, the firm was faced with another consideration. It was evident that it would obtain a considerable volume of work on an agency basis. This would come from persons for whom it had previously handled contracts, and who had confidence in the firm. It would come also from other persons who were obliged to start work before their plans and specifications were completed. The question was whether the volume of work that could be obtained from these sources would be sufficient. It was known that under the usual method of competitive bid, the firm could secure a large volume of work by bidding low enough. It could even expect to secure some work at prices greater than those named by some of the bidders with whom it would compete. Experience has shown, however, that out of a large volume of work thus obtained, about one-third would prove unprofitable—that on a small amount the firm would break about even, and that on the remainder would be able to make enough to show some profit.

It was not desired however, to conduct the business,—or any part of it,—on the competitive bid basis. First, it would be difficult to train men who would be effective in handling agency contracts, where frankness and a sense of value would play the principal parts. In addition, a practical sales difficulty presented itself, namely that if part of the contracts were handled by the firm as agents for the owner and another part as lump-sum contractors, the question would promptly arise in the minds of the owners for whom the firm was acting as agents as to whether it were giving their operations the best men it possessed and attacking their problems with the utmost vigor. There would, at least, be a suspicion that the firm's best energies would be turned to the projects on which the firm's cash was at stake. Accordingly, it was determined to handle the business on but one basis,—that of agents for the owner,—in the belief that, if successful in showing a list of satisfied clients, the firm could reasonably hope to prove to others the soundness of the theories under which it was working. It seemed, that the evidence given by the man whose money had been spent would probably be more effective than any other testimony that could be brought to bear on the soundness of these principles.

The decision wholly to abandon the lump-sum bid and conduct the business on an agency basis necessitated certain minor adjustments. The fact that under the newer method it became easier to make changes in an agency contract necessitated the setting up of an accounting system which would make the firm responsible for the cost of the work carried out according to the original plan. Such a system was devised so that before making any changes, either additions or deductions, the owner is informed as to the probable saving or the probable extra cost of these changes, and so kept constantly informed of the total cost. This was done because many agency contracts proved expensive, not because they were badly handled, but because the owner himself authorized changes without realizing in how much expense he was involving himself.

One other thing, however, is essential to the success of such a business, namely that the firm have no financial interest in any material or any other subsidiary enterprise. This required that no member of the firm should hold a directorship in any liability insurance companies, nor should he involve himself in agencies for any building material. Further, it seemed doubly wise not to own any plant, for various reasons.

In recent years many equipment companies have been developed making a business of supplying contractor's plants. These equipment companies are scattered throughout the country. From them can be obtained a wide selection of good equipment, and, with their ability to furnish this equipment at reasonable rentals and with short freight hauls, it is far more economical for an owner to deal with them than it is to permit a general contractor to railroad his plant to far distant points. Accordingly, the firm determined not to become involved in the plant problem, and followed the theory of owning no plant.

The firm proceeded in its work upon the theory that by combining the knowledge of the estimator and the builder with that of the owner and the designer, greater economies can be effected and better value obtained than by neglecting such coöperation and relying for economy simply upon shrewd buying. The work has been based upon the attack of the preliminary problems involved in the making of the plans and specifications, then intelligently building that which has been determined upon as most effective. It is believed that there is at least 5 per cent to be saved on the cost of the average building by the intelligent carrying out of such a procedure. This statement is made deliberately, and with the knowledge that the operations in the American building trade run to three or more billions of dollars a year. This saving might pay for architects' services.

F.Q.

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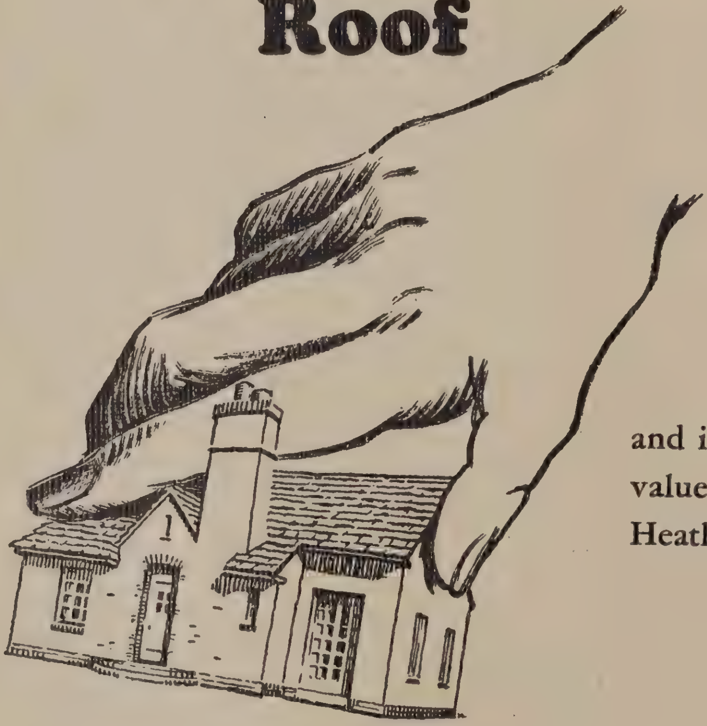

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BOOK DEPARTMENT

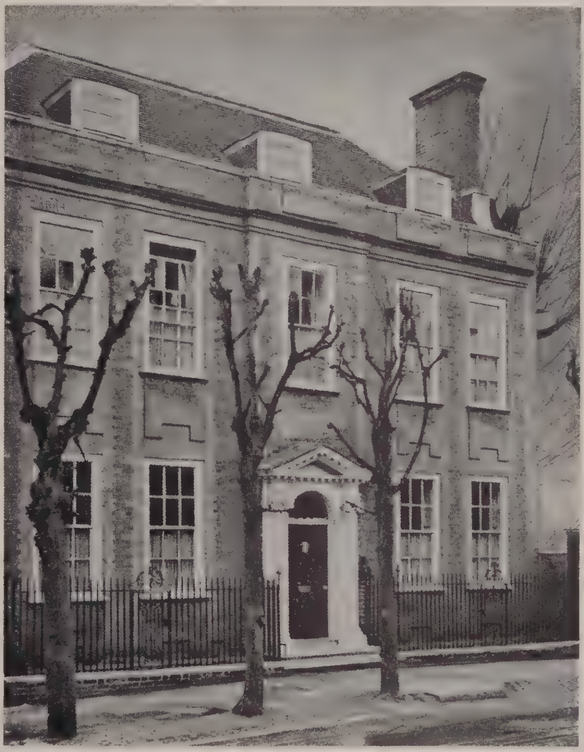
THE PERIOD OF WREN AND THE EARLY GEORGES

A REVIEW BY

CLIFFORD WAYNE SPENCER

NO period of architectural history has had a greater influence on the domestic architecture of the world than that of the part of the eighteenth century which has come to be known as the "Georgian" period. This is particularly true of English and American homes of the upper and middle classes. This period marked the transition between the ages of feudalism and commercialism in the economic system, and the everyday life of the people was characterized by comparative peace and tranquillity. It was an age when the bulk of the well-to-do lived simply and quietly in the country, and the home assumed a paramount position in the thoughts of the people. Another factor which added greatly to the excellence of the type of dwelling developed during that era was the high quality of skilled labor available. Artisans looked upon their work as an art, and the carpentry and ironwork as well as the masonry that went into the making of these houses were perfect in every detail. And so it is but natural in this present age of rush and turmoil, of low cost production and slipshod methods, that when a man wishes to plan a home of particular fineness and dignity, he should turn for inspiration and precedent to the rich traditions of the early Georgian period, as they are exemplified in the fine old houses scattered throughout the English countryside, and in Virginia and the older colonies in our own country, where many old homes are still existing.

It has been said that Sir Christopher Wren was the man who gave the English touch to Renaissance architecture, and his influence is to be found in houses built throughout the whole period, for he was particularly fortunate in being followed by a number of highly skilled artisans and builders who emulated his style and carried on his ideals without displaying the bad taste which so often results from attempts to copy the work of a master. Unlike the work of Inigo Jones, Wren's building was more influenced by French than by Italian ideas, and it was still further enriched by the brickwork of the Dutch influence, fostered during the reigns of the late Stuart sovereigns. In the use of this brickwork in connection with Portland and other stone, Wren was particularly successful, and this sort of work became one of the outstanding features of the Georgian style. Another thing about the work of Wren which makes it particularly adaptable and desirable as precedent for present-day dwellings was his genius for achieving beauty at a comparatively low cost. He attained his effects, "not by expensive elaboration, but by the careful proportioning of the various parts, by concentration of ornament in the most telling positions, or by one outstanding feature in the design." His influence continued to be paramount in architectural design throughout the Georgian period, and even long after his death the Wren type of house with its stately square façade, the entrance enriched by an adaptation of one of the classic orders, its sashed windows with broad glazing bars and frames but little recessed from the masonry, forming a well ordered and pleasing pattern on the conventional squareness of the brick exterior, became standard for English and Colonial houses of the better class. Other features characteristic of this type of house are the walled forecourt with its gateway of substantial but ornamental metal, the pitched tile roof rising from a bracketed wood cornice, and on the interior the painted wood paneling extending from floor to ceiling, with perhaps the greatest interest centered in the stair hall where a flight of graceful steps mounts upward with its profusely clustered balusters and richly carved string facing, giving an impression of great strength and richness to the whole.


"The Barons," Reigate, Surrey
From "Houses of the Wren and Early Georgian Periods"

In seeking an understanding of the characteristics of any particular type of architecture or art it is always well to look to the examples which were wrought early in the history of that particular school. It seems that in the work of the early masters it is much easier to distinguish the fundamentals underlying the general effect than it is to discover these same fundamentals in the work of the later artists and builders. In the later examples some of the original purity has been sacrificed to personal characteristics, and other schools of design and thought have often had a modifying effect on the design. So in seeking precedent for the so-called Colonial type of architecture which is so popular at the present time it is well to first study this type of building at its source, —in other words, in the houses of the early Georgian period in England. A series of illustrations and measured drawings of such houses is presented in a new book entitled, "Houses of the Wren and Early Georgian Periods," by Tunstall Small and Christopher Woodbridge.

In this collection there are presented eleven of the finest examples of this type of house to be found in all England. In most instances they have the advantage of not having been over-photographed, so that even those who have traveled extensively in England as well as those who have made careful study of the published material on this type of house will find much fresh inspiration and many new ideas in the pages of this book. The introduction, written by William G. Newton, F.R.I.B.A., furnishes the correct historical background for the subject matter, and gives an interesting insight into the conditions under which this type of architecture was evolved. With the exception of one house which is located in Essex, the examples are all taken from London or Surrey, and in most cases they are set back from the street but a short distance, the intervening space being occupied by a forecourt surrounded by a brick wall or an iron fence. Illustrations and measured drawings of these fences add greatly to the interest and value of the book. The collection of measured details is especially attractive and will be of incalculable value to the architect in his every-day practice. Several of these are shown in connection with each house and add greatly to the usability of the illustrations themselves, which include close-ups of the more interesting details. In some cases general views of the houses are shown, but for the most part the selection of illustrations and drawings given, make the book valuable as a source of material in designing the detail of this type of house, rather than as a guide to laying out and designing the entire building. In looking over these illustrations one is struck by their resemblance to many of the examples of Georgian Colonial architecture to be found throughout the older sections of the United States. This is a testimonial to the faithful way in which the skilled artisans and builders who came to America from England in the eighteenth century carried on the traditions of Wren and the English Georgian builders. These houses are especially plentiful in Virginia and some of the southern colonies and have furnished much of the inspiration that has gone into modern adaptations of the Georgian style in this country.

A brief description of some of the houses included may be of interest in giving an idea of the scope and completeness of the work. Nos. 37 and 39 Stepney Green, London, is a fine old house which because of its isolated location in a former fashionable suburb of London is little known. Perhaps the most striking feature of this particular house is the attractive hooded entrance doorway, reached by a flight of steps with a graceful iron handrail from the forecourt which is divided off from the street by a dwarfed brick wall surmounted by a substantial and interesting iron fence. The house is presented by a half-tone and measured drawing of the main façade, and a close-up of the front door already mentioned, accompanied by detail drawings of the doorway

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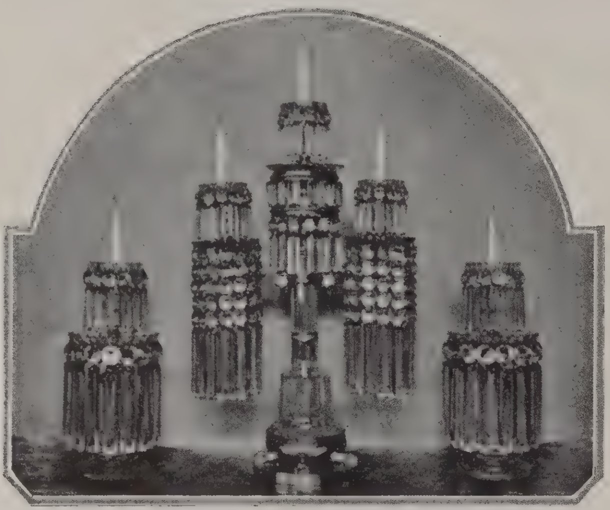

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and iron baluster. On the interior the stair hall is especially interesting, as is usually the case with this type of house. A general view of this is shown and is augmented by two close-up views of the staircase, showing clearly the richly carved balusters and string consoles.

Line drawings and details of these features make them readily available for use in prospective buildings. "The Barons," Reigate, Surrey, is a charming old house built directly on the street and having no forecourt, but having a simple, well arranged iron fence across the front. The entrance doorway is a fine example of the use of the Ionic order in Georgian detail. The effect of stateliness in the façade is enhanced by the use of continuous vertical panels of contrasting shades of brick and this instance gives a good illustration of the way in which the Georgian builders attained pleasing effects by this means. The heavy brick cornice of the front façade is not returned across the end elevations, but these ends are made interesting and pleasing by means of ramped walls on either side of the double chimney stacks. The interior of this building is also full of interesting detail which is illustrated in half-tone and line drawings. The descriptions of these houses deal with but two of the many fine examples of Georgian architecture shown in this work, but as is always the case in regard to volumes of this kind, it really must be seen to be appreciated.

HOUSES OF THE WREN AND EARLY GEORGIAN PERIODS. By Tunstall Small and Christopher Woodbridge. 139 pp., 10 x 13 ins. Price $10. William Helburn, Inc., New York.

LONG before man could read or write he made use of the language of symbols,—a story told by a familiar sign that could be read at a glance without the help of the printed word. It is a language of universal significance, and therefore of value in all ages from pagan times to the present. Even today we use symbols. The red flag fluttering by the side of the road or the red lantern hung out at night means danger. Crossed boards mean a railroad crossing; the striped pole indicates the barber shop. The federal government has its flags and seals. Such things are of value, not for their beauty and artistry, but for their significance, and the stories they tell. Symbols should be instructive, not merely ornamental; they have been used in all ages because of their powerful educational value.

But it was the mediæval centuries that were the golden age of symbolism, as Mr. Webber makes clear in his volume. At that time books were so precious and rare that the masses had no access to them. Made and lettered by hand, they were so priceless that they were kept chained to the reading desk, just as a cup is chained to the pump,—that no one might run away with it. Few but the clergy could read and write. Religion was taught to the people only as it was pictured in the sculpture or painted glass of their churches. And because religion was their passion, symbols of profound significance blazed through the stained glass windows or were carved in wood and stone on the walls until every cathedral was a great colorful picture book. The churches thus became schools as well as places of worship.

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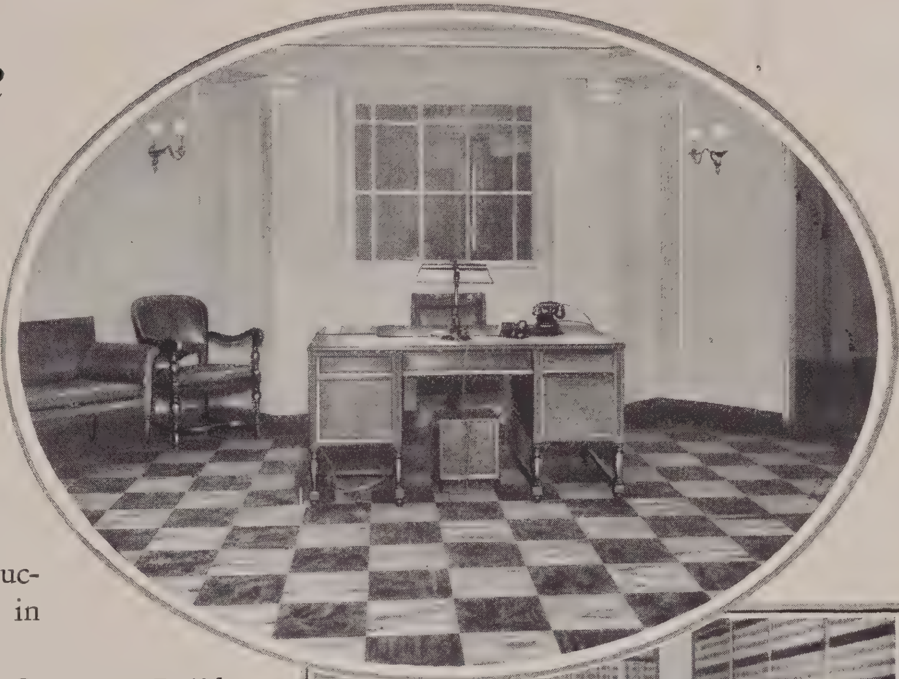

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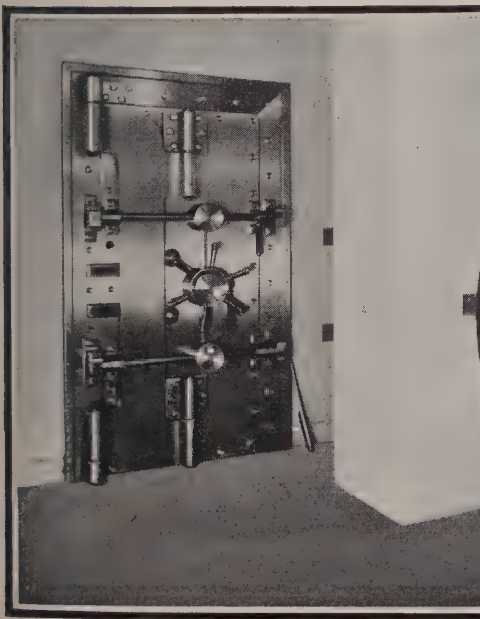

Above: Battleship Linoleum in library of Jerome & Rand, Counselors at Law.

Top: Marble-ized Cork-Composition Tile in reception room, Murray, Aldrich & Roberts, Counselors at Law.

Left: Bonded Floor of Battleship Linoleum in working spaces of Equitable Trust Co.

Extreme left: Bonded Floor of Battleship Linoleum in vaults of Equitable Trust Co.

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days read their sacred and ecclesiastical history. Here were religious symbols in their purest, most spiritual form. For a symbol should be representative of something,—not a representation. The Lamb of God (*Agnus Dei*) symbol of Our Lord, should not be a realistic little woolly lamb but one of conventional design. It should be significant of the idea it stands for, not a photographic likeness of it. The mediæval artist and craftsman emphasized the spiritual qualities in these symbols. The appeal was to man's inner or devotional nature, not to his admiration as an art critic. The angels' pictures on stained glass windows were majestic beings, sexless and beardless, carrying the lyre or else the lily symbolical of purity. Cherubim were noble figures whose color was sapphire blue, with four wings "full of eyes" and "hands the likeness of a man." But with the dawn of the Renaissance the spiritual quality began to recede. The paintings and carvings on the walls, the color pictures in the windows became realistic, clever and emotional. "The church decorations of that age are remarkably fine," says Mr. Webber, "from the standpoint of color, anatomy and chiaroscuro, but from a religious viewpoint, their value was greatly weakened. It was when angels degenerated into plump females with pretty faces devoid of character, clad in flowing robes that carefully recorded all the charms and curves of womanly anatomy." It was when cherubs became "chubby infants with mischievous faces" that symbols lost their pristine value and purity and were frankly misused. It was not merely bad painting, he insists; it was also bad theology. The result was chapels or churches of such "over-ripe magnificence as Sainte Chapelle, Rouen and Troyes and the nineteenth century stiffness of Cologne." This tendency, he explains, has continued until much of the modern stained glass, especially that of the "picture window sort" has reached a stage of "commercialized vulgarity and elaboration that staggers one's vocabulary of opprobrious epithets." As symbols became emotional and sentimental rather than spiritual, art degenerated.

Thus, in his volume, "Church Symbolism," Mr. Webber makes bold to challenge the belief that the middle ages were the dark ages. If they were devoid of artistic inspiration, how could such achievements as Chartres, Reims and Amiens have emerged from them? At least the artists and craftsmen of those days understood symbolism in its most profound significance and executed it with a dignified purity which has since been unrivaled. A book on church symbolism, he explains in his preface, should be like a dictionary. It must contain all religious symbols, whether or not their meaning is in harmony with one's own creed and belief, just as a telephone directory would be useless if it contained only the names of one's friends and omitted all those of whom one did not approve. Therefore he has included a more or less detailed list of both old and new testament symbols, even those which at some age or other have been considered idolatrous. Most of these are illustrated by plates and contain interesting facts as to their origin and significance. Yet the book is by no means only a dictionary or glossary. Its major theme is a plea for the freer, purer, use of symbols in present-day church architecture,—an argument in behalf of more and more beautiful churches.

CHURCH SYMBOLISM. By F. R. Webber. 395 pp., 7 x 10 ins. Price $7.50. J. H. Jansen, Cleveland.

The Smaller Houses *and* Gardens *of* Versailles

By Leigh French, Jr. and Harold D. Eberlein

FOR the moderate-sized American suburban or country house there is nothing to follow in the way of a type at once more beautiful and more practical than the seventeenth and eighteenth century French houses of the same kind. The type possesses that graceful balance in the way of exterior design and that slight degree of formality of interior which is being expressed in current domestic work of the same character, and from all the domestic buildings of seventeenth and eighteenth century France there is nothing which offers a more fruitful basis for study than the smaller villas built near Versailles for the attendants of the French court. These buildings possess in an unusual degree just those qualities in the matter of design now most sought for in America.

202 Pages, 9¾ x 11¾ Inches. Price $6.

THIS volume, prepared by two students of French and American architecture, is a practical study into the adaptation of the simpler French forms to American conditions. There is not one of the many villas illustrated which does not afford abundant suggestion in the way of exteriors to present-day architects, and the interiors with their simple and graceful disposition of wall paneling, mantels, and stairways abound with suggestions for working out interiors to accord with the expression given by the buildings' exteriors. Plans in many instances are easily adapted for use today, and the arrangements of the gardens and other outdoor areas offer suggestions for making these important adjuncts to American suburban or country houses heighten the character and interest of the buildings themselves.

THE ARCHITECTURAL FORUM, 383 MADISON AVENUE, NEW YORK

THE EDITOR'S FORUM

EDWARD P. YORK

ONCE again the architectural press is called upon to chronicle the passing of a distinguished member of the profession in recording the recent demise of Edward Palmer York, senior member of the firm of York & Sawyer. Born in 1865 at Wellsville, N. Y., he studied architecture at Cornell University before entering the office of McKim, Mead & White, where for some eight years he worked as a personal assistant to the late Stanford White, engaged, in addition to work on many other buildings, upon the designing of the residence of the late Levi P. Morton, Fifth Avenue and 53rd Street, which was torn down some years ago.

Mr. York's practice as an architect might be said to have been begun when in 1908 he won a competition for the design of the Rockefeller Recitation Hall at Vassar. During the many years when he was a partner of the firm of York & Sawyer, a great number of important projects were under his direct charge; among them were the widely known Bowery Savings Bank and the almost equally famous Fifth Avenue Hospital, and the beautiful building of the Academy of Medicine, in New York; the structure occupied by the Central Savings Bank, Broadway at 73rd Street, New York, is also his work. Recently he designed the group of buildings intended for the engineering school of his old University, Cornell; he was looking forward with the greatest interest to the construction of the new building for the Department of Commerce in Washington, the contract drawings for which had been recently approved by Mr. Hoover, and he was to have assisted on January 14, at the ceremonies of opening the Euthenics Building at Vassar, which he had just completed. THE FORUM must also mention the distinguished group of buildings for the law department of the University of Michigan, donated by W. W. Cook, which was also the work of Mr. York Always quiet, very retiring and modest, he was a man of studious but broad tastes. Archæology interested him enormously, and he intended to see Egypt and Mesopotamia next year. He was a member of the Numismatic Society and could always produce from pocket or drawer a coin of more than usual beauty in design or execution or having a fine patina. Mr. York was also a member of many clubs.

His death means not only a loss to his family, his partners and profession and to his friends, but to a host of acquaintances, fellow club members, and to members of the building trades, all of whom will miss his cheerful humor, his unfailing sympathy and helpfulness and his refreshing point of view, always original, freshly presented, and in language never anticipated. The country has had few architects who have given more to their communities.

THE PRIX DE ROME

THE American Academy in Rome has announced its annual competitions for fellowships in architecture, landscape architecture, painting, and sculpture. In architecture the William Mead Fellowship is to be awarded; in landscape architecture the fellowship is provided by the Garden Club of America Fund; the fellowship in sculpture is supported by the Rinehart Scholarship Fund of the Peabody Institute of Baltimore.

The competitions are open to unmarried men, not over 30 years of age, who are citizens of the United States. The stipend of each fellowship is $1500 a year for three years, with allowances of $500 for transportation to and from Rome and $150 to $300 for materials and incidental expenses. Residence and studio are provided at the Academy, and the total estimated value of each fellowship is about $2500 a year. The Grand Central Art Galleries, New York, will present free membership in the Galleries to the painter and sculptor who win the Rome Prize and fulfill the obligations of the fellowships.

Applications will be received until March 1. Circulars of information and application blanks may be secured by addressing Roscoe Guernsey, Executive Secretary, American Academy in Rome, 101 Park Avenue, New York, who is in charge of the competition, and from whom any desired data may be had.

BROWN TRAVELING SCHOLARSHIP COMPETITION

ANNOUNCEMENT is made of the second annual competition for the selection of a beneficiary of the A. W. Brown Traveling Scholarship, this competition to be held under the direction of a committee of the American Institute of Architects. Programs will be mailed to applicants about March 1, 1929, drawings to be delivered on April 1, 1929. This scholarship is the gift of the Ludowici-Celadon Company and is a memorial to the late A. W. Brown, who was for many years president of that company and a leader in the manufacture of roofing tile. The value of the scholarship is $2000, to be used toward defraying the expenses of a year of travel and study in Europe by an architect or an architectural draftsman. Traveling expenses between the winner's place of residence and New York will be paid in addition to this amount. An award of $250 will be made to the individual whose design is placed second in the competition; $150 to the competitor whose design is placed third; and $100 to the individual whose design is fourth. Those wishing to compete should write for application blanks to the secretary of the committee, William Dewey Foster, 25 West 45th Street, New York.

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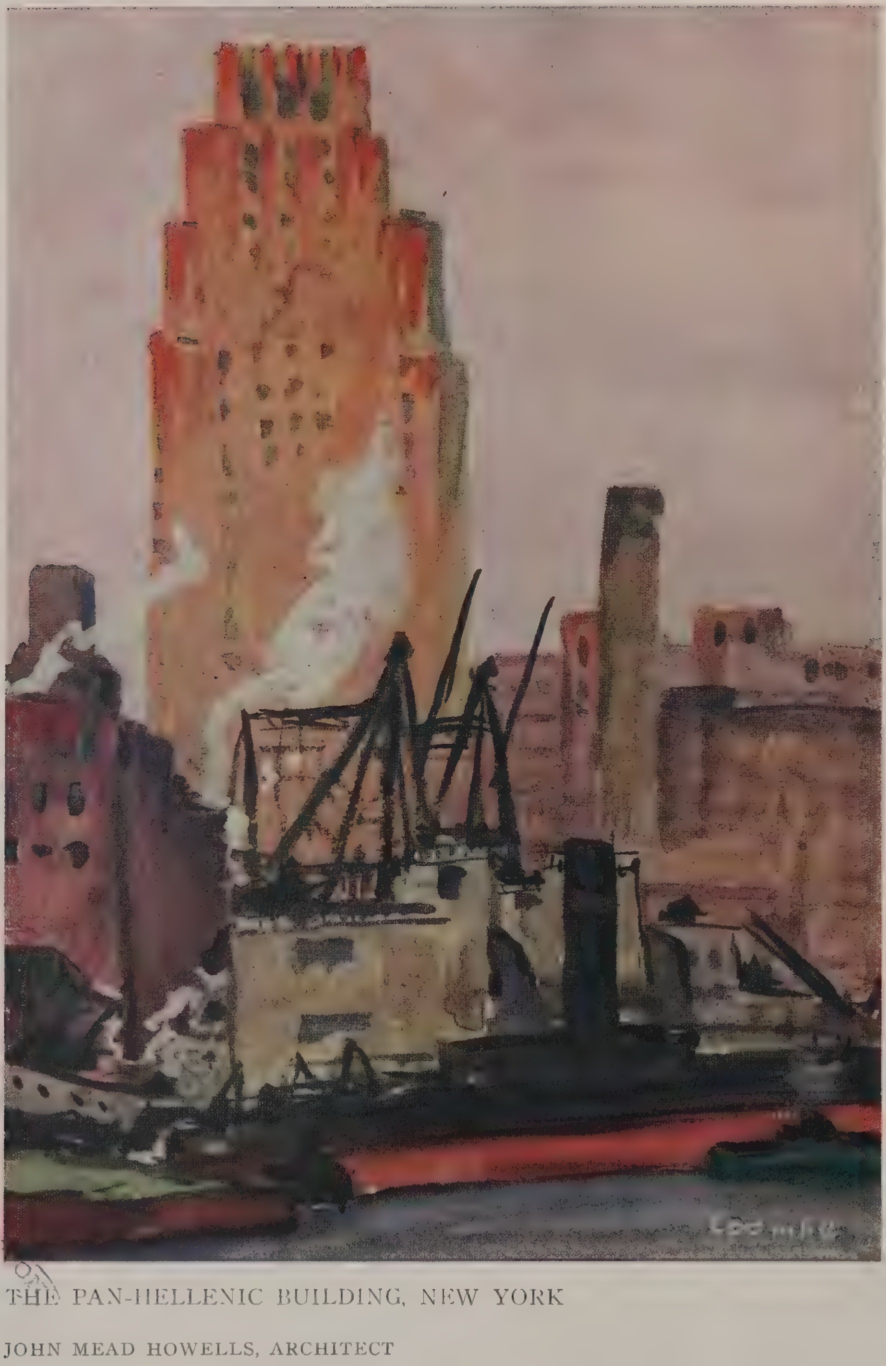


THE PAN-HELLENIC BUILDING, NEW YORK

JOHN MEAD HOWELLS, ARCHITECT

From a Water Color Sketch by George B. Coombe

THE
ARCHITECTURAL
FORUM

VOLUME L NUMBER TWO
FEBRUARY, 1929

TWO CORNISH FISHING VILLAGES

BY

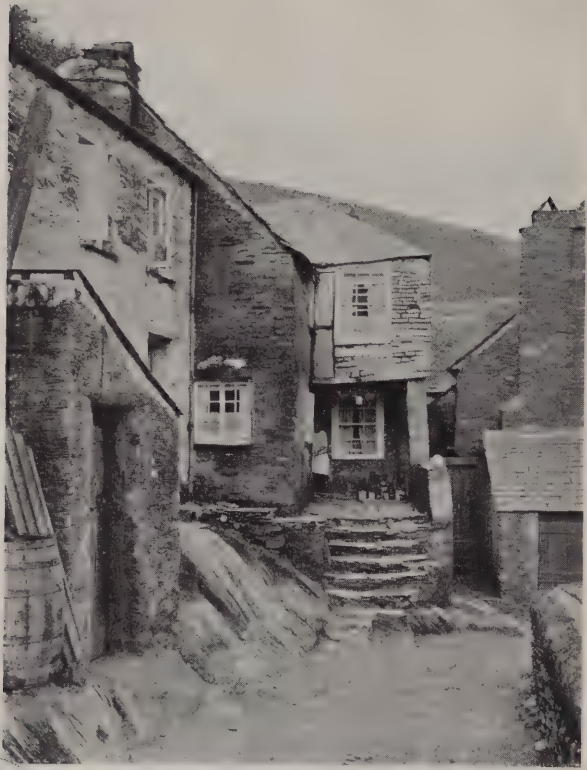
R. RANDAL PHILLIPS

As one leaves Hampshire and Wiltshire behind and reaches the rich, rolling land of Devon, one becomes conscious of a distinct change, alike in the landscape and the houses. This is the beginning of the West Country. There is a peculiar charm about it, and a varying interest. The villages of Devonshire, with their old whitewashed walls and thatched roofs, racy of the soil, are part of a mellow setting marked by luxuriant woodland and cultivated fields. In Cornwall the scene changes. This is a country of rugged outline, bleaker in aspect, yet possessing an individual attraction, a land of rocks and minerals, with but a sparse covering of soil to give that richness of landscape which distinguishes other counties of southern England. It is the coast line in Cornwall that lures the eye. Ensconced in coves and little harbors is many a delightful fishing village. Among them are Polperro and Cadgwith, the former about 20 miles west of Plymouth, the latter about the same distance west of Falmouth, and only a few miles from the "Lizard," which is the southernmost point of England. Both are off the beaten track, and until the last few years,—since the coming of the inexpensive car,—were practically unknown to the outer world. Thus they have preserved themselves intact, living descendants of centuries ago,—fishing villages of simple character, possessing the charm inherent in simple things.

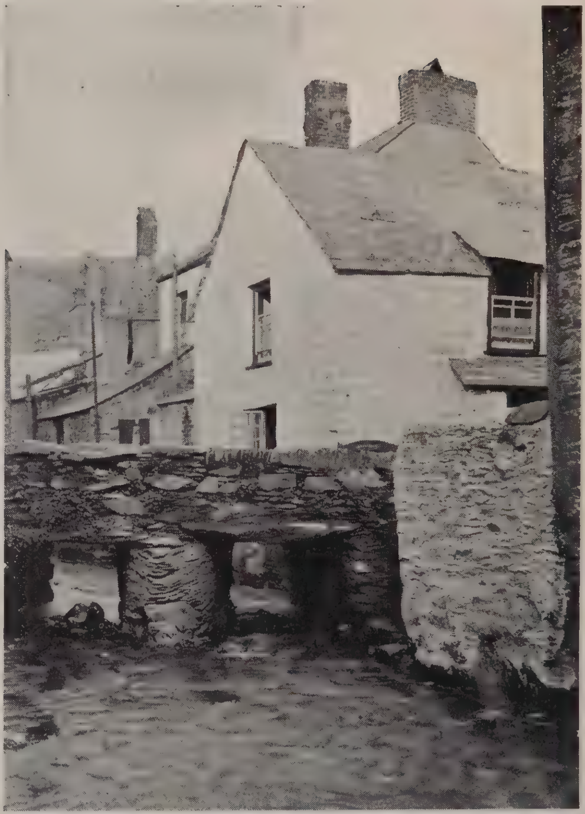
They are remarkably similar in their general aspect, for each is situated at the foot of a narrow valley, with high rocky coast hemming in the seaward entrance, and in each is a spur that juts out at the center, giving protection to the harbor in the case of Polperro, and to the cove in the case of Cadgwith. Polperro has the more rugged setting, and its charm is of a rather austere kind; Cadgwith is softer in its appeal, and the comparison is borne out by the houses no less than by the setting in each case. In Polperro we find all the houses built of local stone, and roofed with either this or with slates covered with a "slurry" of thin cement, which gives to the whole aspect of the village a grayish tone. Cadgwith, on the other hand, reminds one of Devonshire, for its old houses are built either of stone or cob (or a mixture of the two) and roofed with thatch, the wall faces being either whitewashed or ocher-colored.

Both of these two old fishing villages have one dominant characteristic,—a haphazard grouping of the houses, and their placing primarily to secure coziness and comfort. The idea of "building for the view," on high ground where all the inclemencies of the weather are suffered as a penalty for the fine prospect that may be enjoyed, is quite modern. The old people never did this sort of thing. The churches were the only buildings that were set high and exposed, and this was done in large measure because the church towers served as landmarks. The people put their houses in sheltered places, and so it is that at Polperro and Cadgwith the old houses huddle together in the bosom of the valley, where they get the utmost shelter from wind and rain. At Cadgwith, too, this main endeavor is further illustrated by their placing in regard to aspect. The cove faces southeast, and all the houses are set end-on to the cove. If Cadgwith were a modern place, of course the houses would be turned so that their fronts looked seaward. But the old people who built these houses,—probably two or three hundred years ago,—believed that it was better to have the blank gable ends as buffers to bad weather. This deliberate choice, and the making of their rooms with small windows set in very thick walls, resulted in less sunlight and air inside the houses than we should consider essential today, but to people who spent the greater part of their waking hours in the open air it was obviously a small matter in comparison with the conditions that prevail, say, in a working class urban population of our own time, with men and women engaged in indoor work.

These Cornish houses are almost invariably single-room deep. On the ground floor there are generally two rooms separated by a passage that leads in from the entrance door, with the staircase at the end of the passage, giving access to two or three bedrooms on the next floor. The rooms are rather low (about 7 feet high) and are beamed across, with the beams left exposed. One



FISHERMEN'S COTTAGES, POLPERRO



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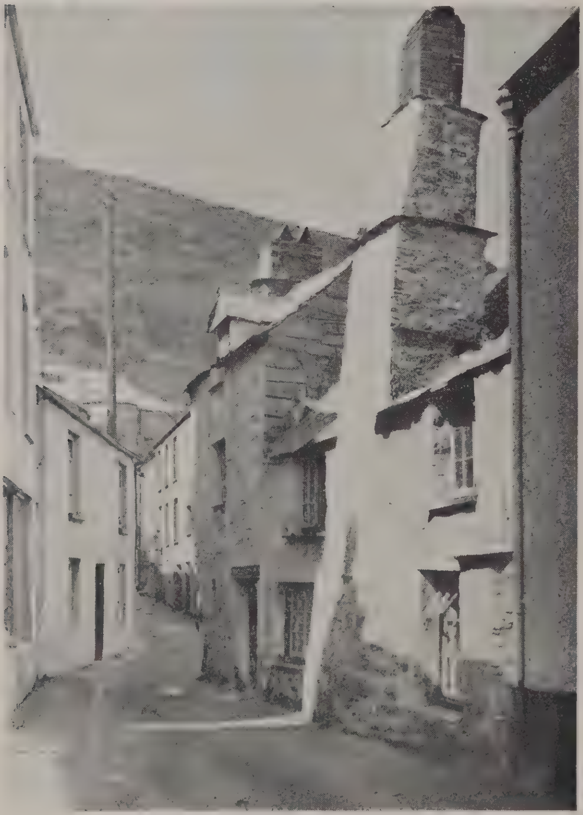
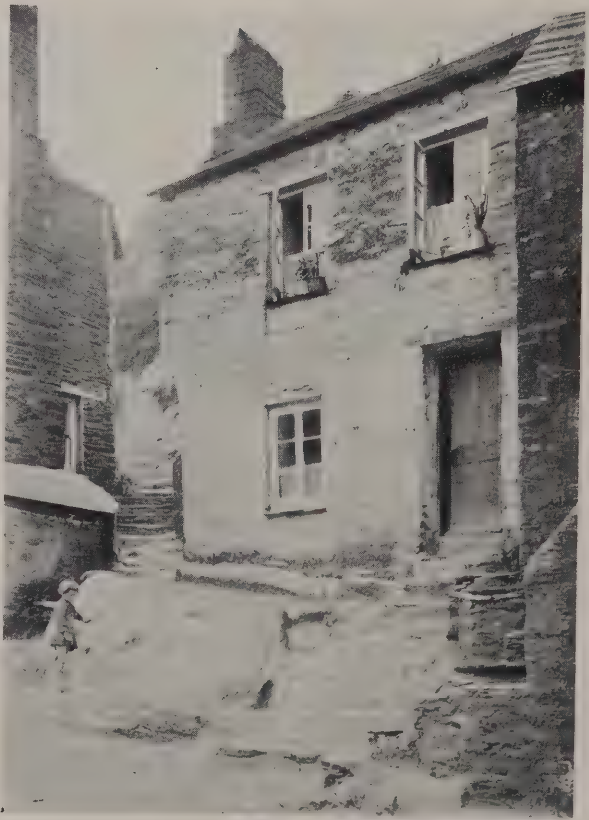
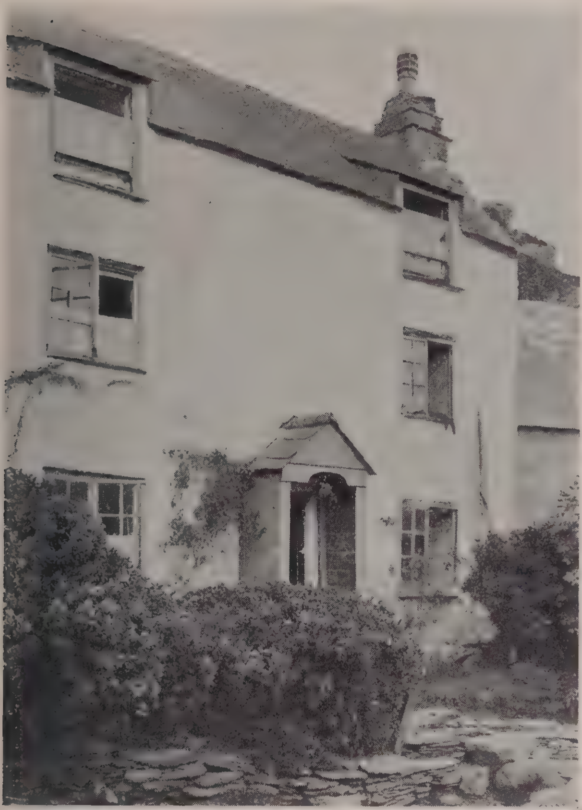


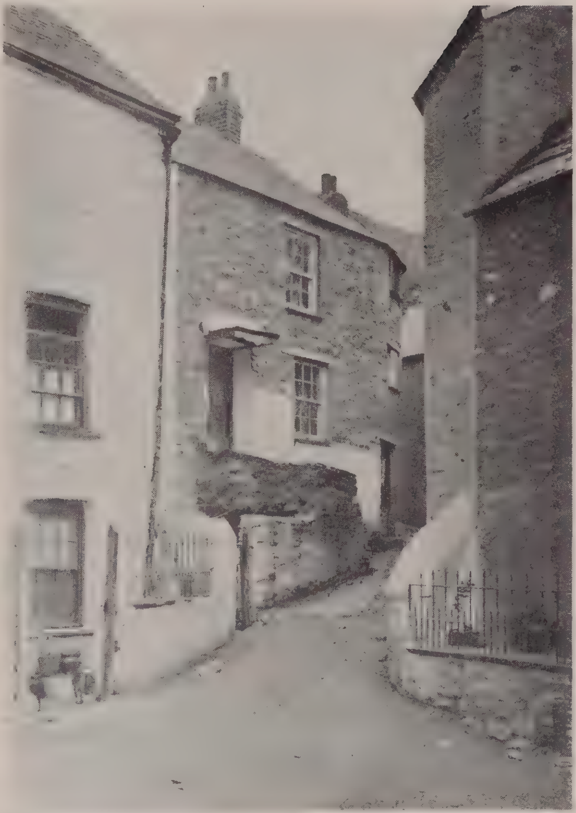
A NARROW, WINDING STREET, POLPERRO



A WAY UP TO THE CLIFF WALK, POLPERRO



OLD HOUSES OF EAST CLIFF, POLPERRO



A TURNING OFF THE MAIN STREET, POLPERRO

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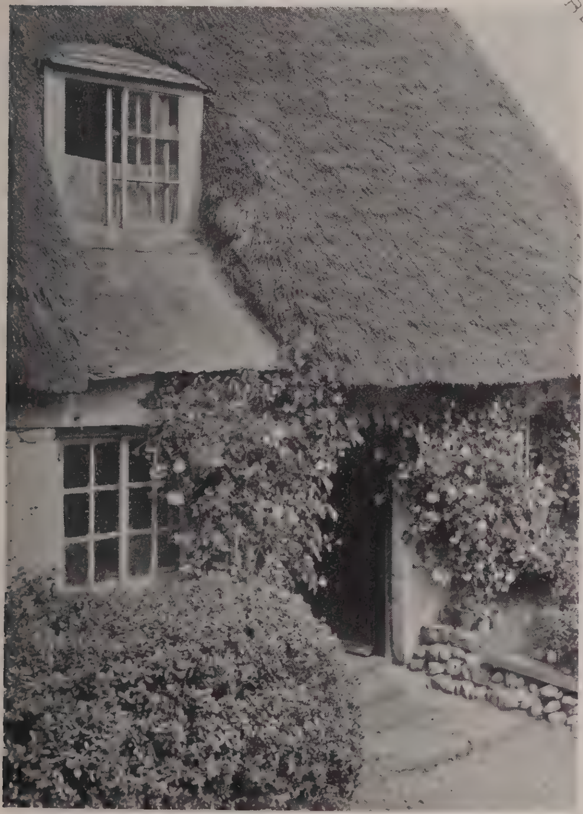
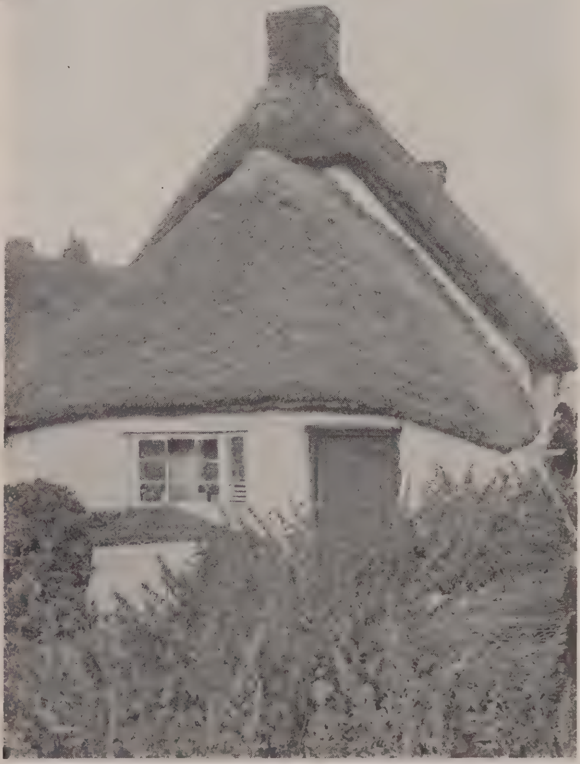
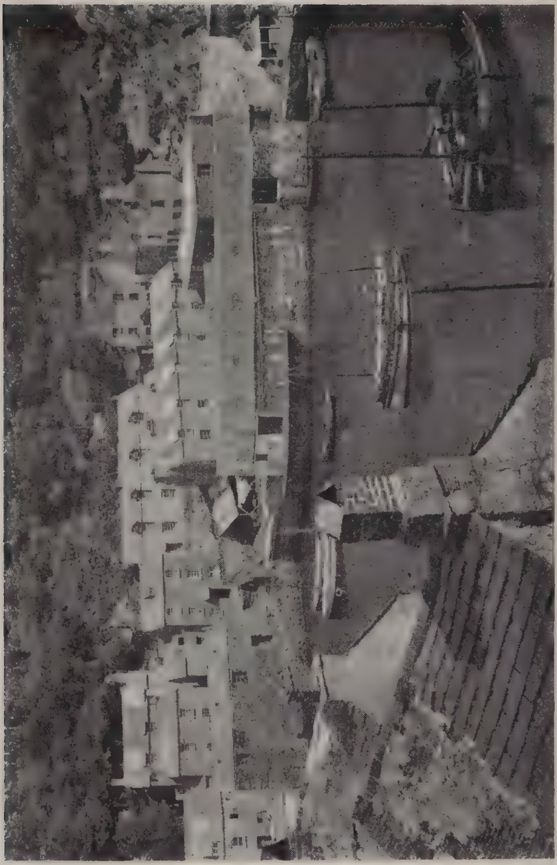


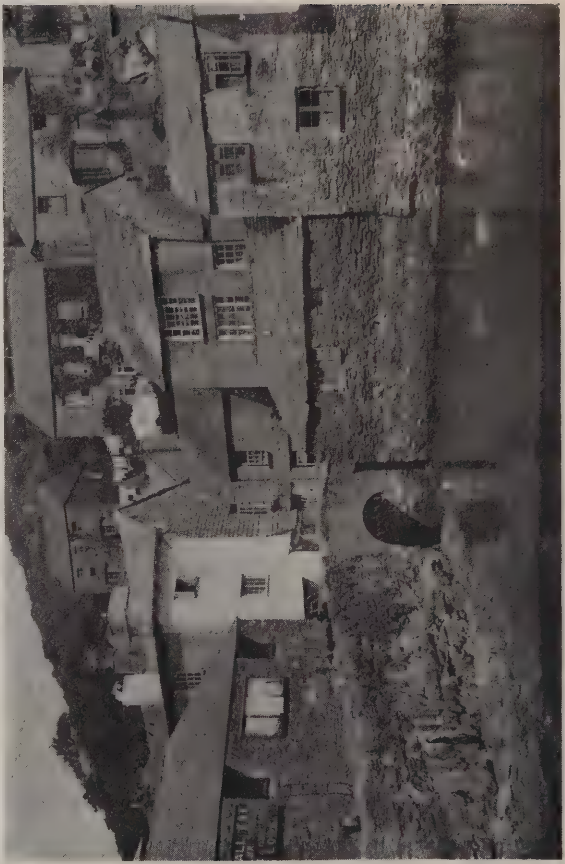
A COTTAGE DOORWAY, CADGWITH



OLD THATCHED ROOFS, CADGWITH



FROM THE WEST CLIFF, POLPERRO



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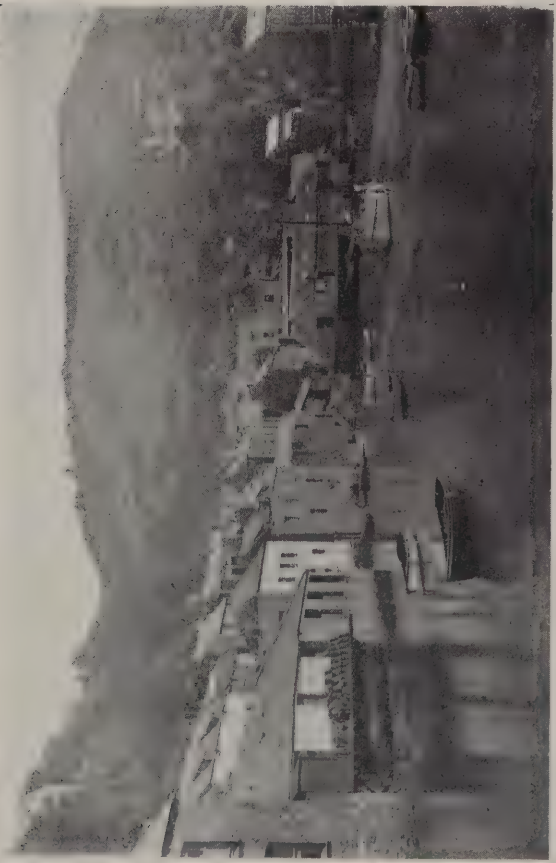
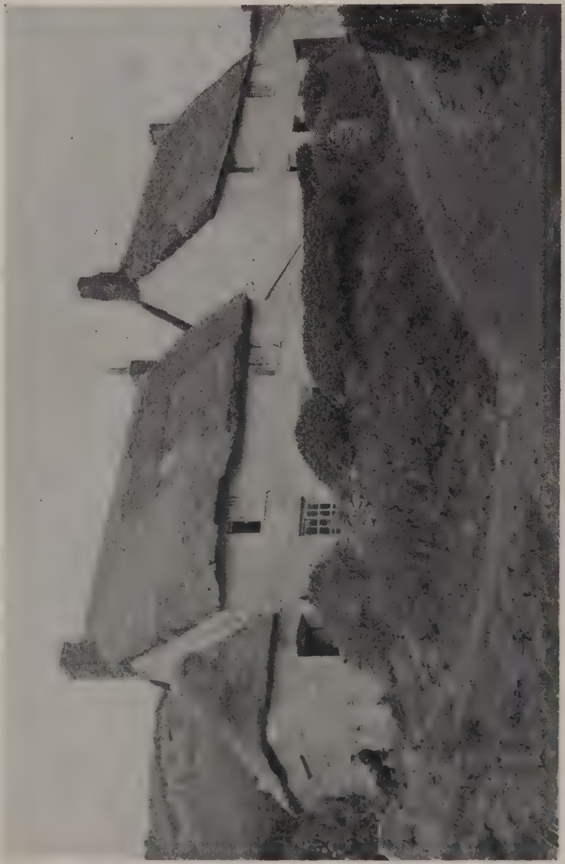


THE HARBOR, POLPERRO



FISHERMEN'S COTTAGES, CADGWITH

OLD BARNS AT ST. ANTHONY

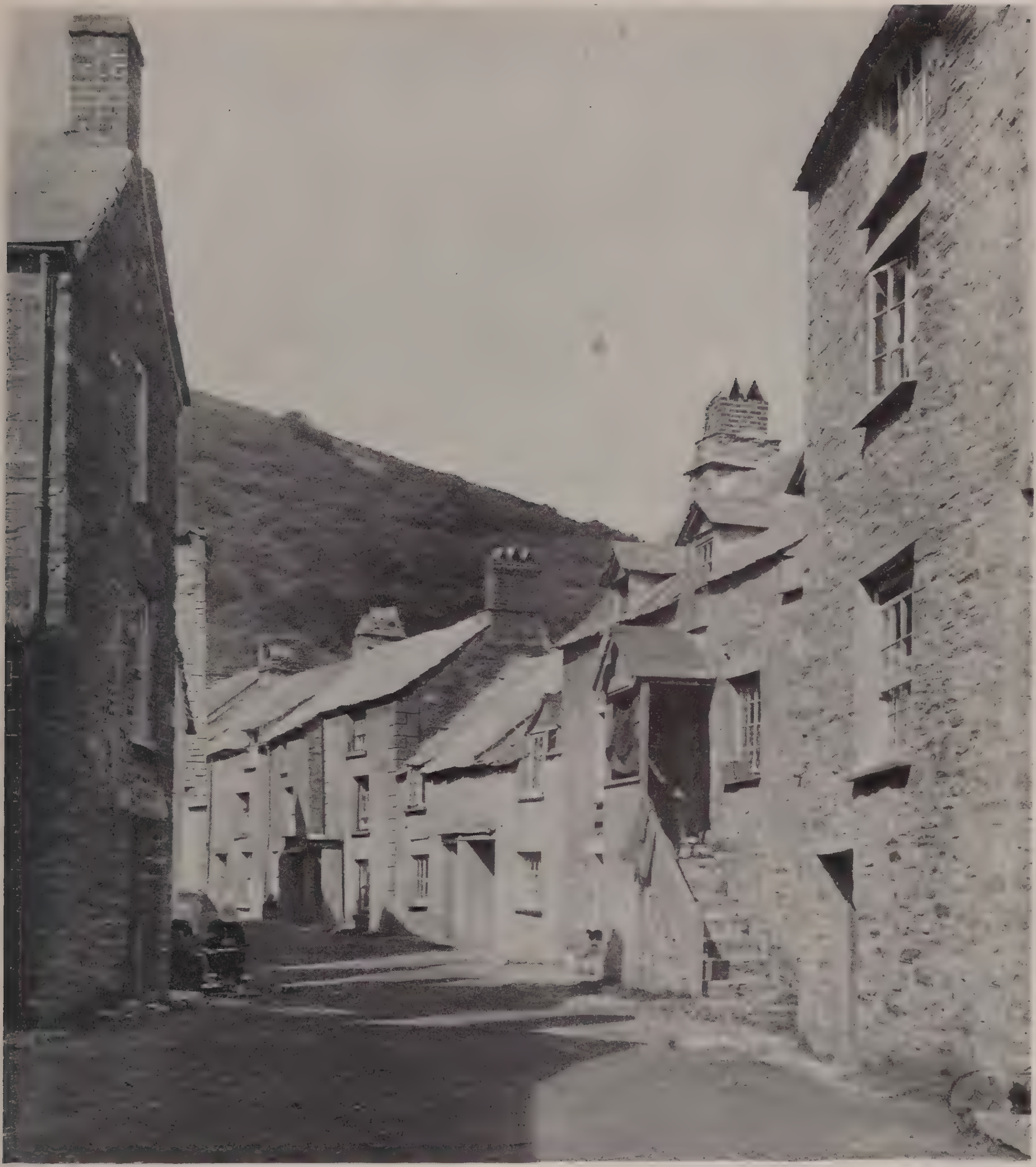
AT RUAN MINOR, CADGWITH

OLD COTTAGE, CADGWITH

AT RUAN MINOR, CADGWITH

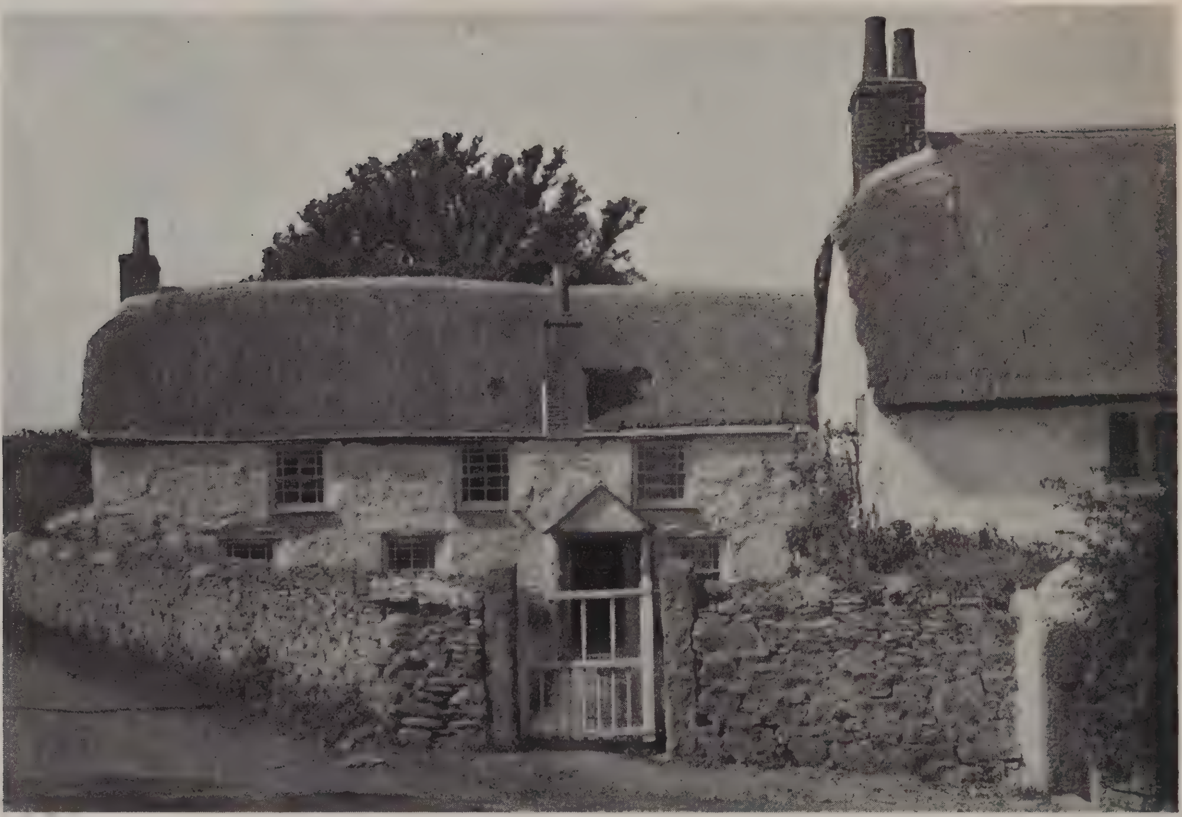
The Harbor, Polperro

of the two ground floor rooms is the common living room-kitchen, the other being a sort of parlor. It is very rarely that one finds the fireplaces in their original condition, for newer methods of cooking have spread to these out-of-the-way places, just as they have affected urban houses. The old fireplaces were of the familiar open kind, with wood fires burning on the hearths, and very ample chimney flues going straight up to the tops of the stacks. The old openings have in later days been filled in, and the common fitment is a West Country range, consisting of a high-set fire with a removable ashpan below it and an oven on the right. The range is bedecked with brass knobs and rails, and the housewives take particular pride in keeping these bright and shining. Incidentally it may be mentioned that the range is amply efficient. There is, of course, no such thing as hot-water supply, but the fisher folk seem to get on quite well without it; indeed the common practice is for domestic ablutions to be carried out in a pail on the garden wall! This custom still obtains.

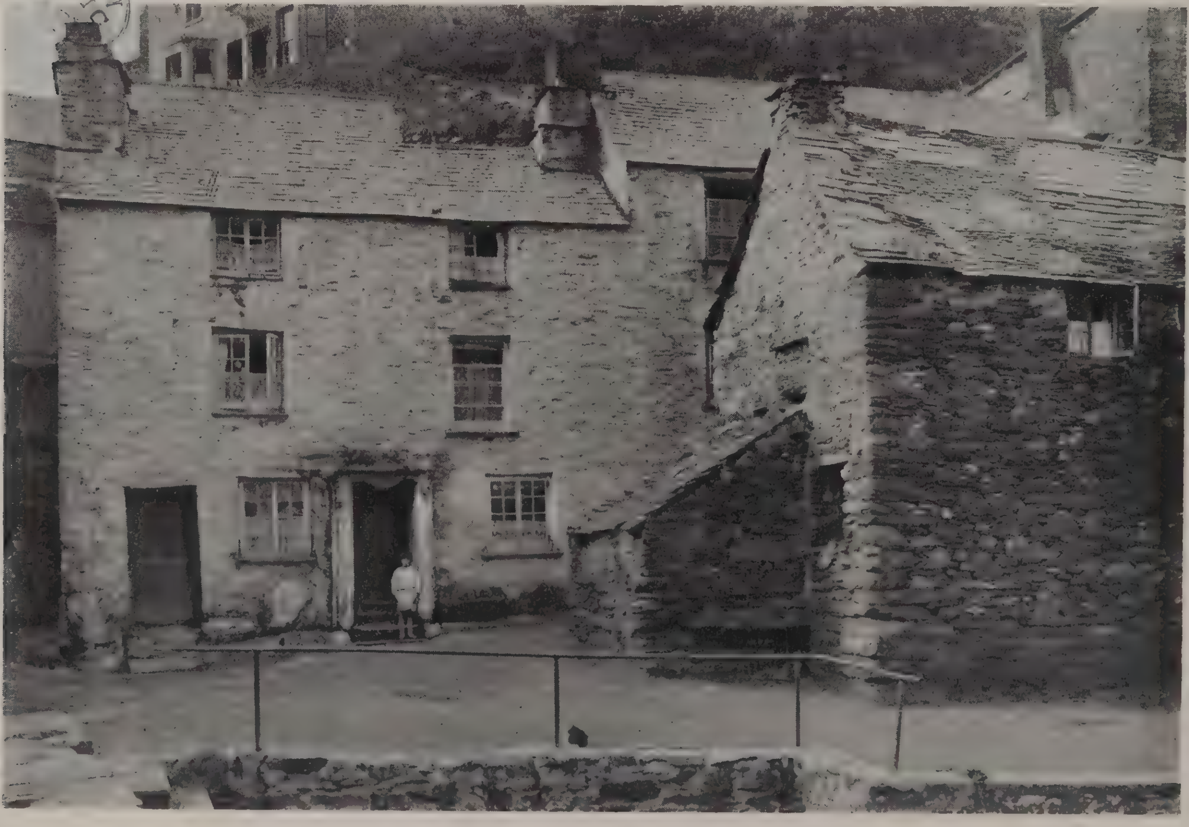


Street Leading Up From Harbor, Polperro

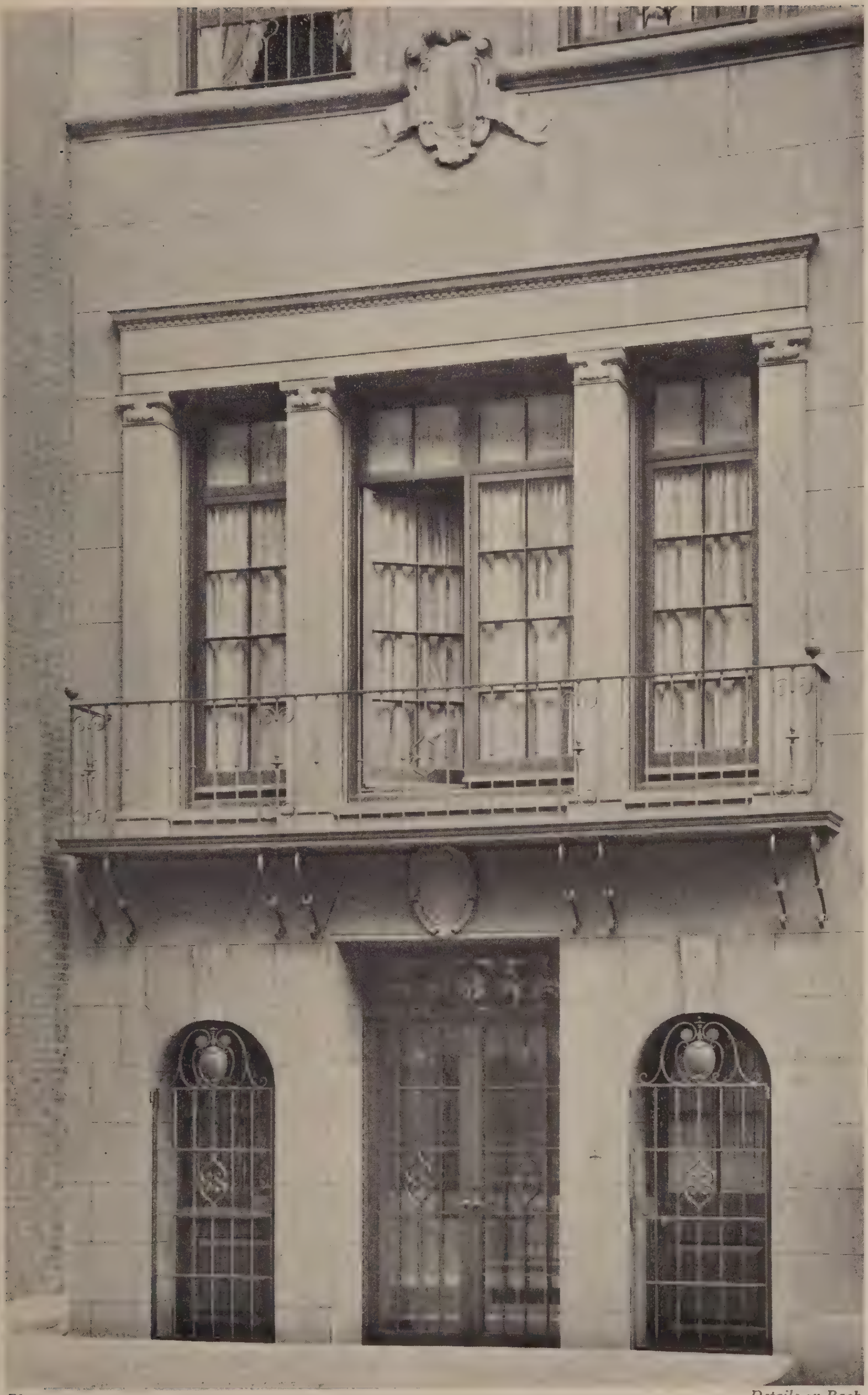
Pilchards used to provide the great catch for Cornish fisher folk, but in recent years, due probably to the operation of steam trawlers, the fish have gone away from many places. In former days the catching and salting of pilchards formed quite an extensive industry, and in many old houses, especially those at Polperro, we find underground places where the salting was carried out. Another feature of some houses is the provision of an outside staircase,—an inconvenient arrangement to modern eyes, but one which enabled the utmost use to be made of the small space enclosed by the cottage walls. The latter are roughly built, often with large blocks in random courses, and the time-honored practice is to give the whole face of the house a wash of lime. Occasionally we see all the jointing lines picked out with a dark mortar or paint, but this is only one more instance where a bad modern practice has followed the decline of tradition in house building. As regards the windows, these originally were latticed, but very few old lattices have survived. In their places are often seen windows consisting of two sashes,—one fixed, one sliding.



OLD COASTGUARD COTTAGES AT ST. ANTHONY



OLD HOUSES BY THE HARBOR, POLPERRO



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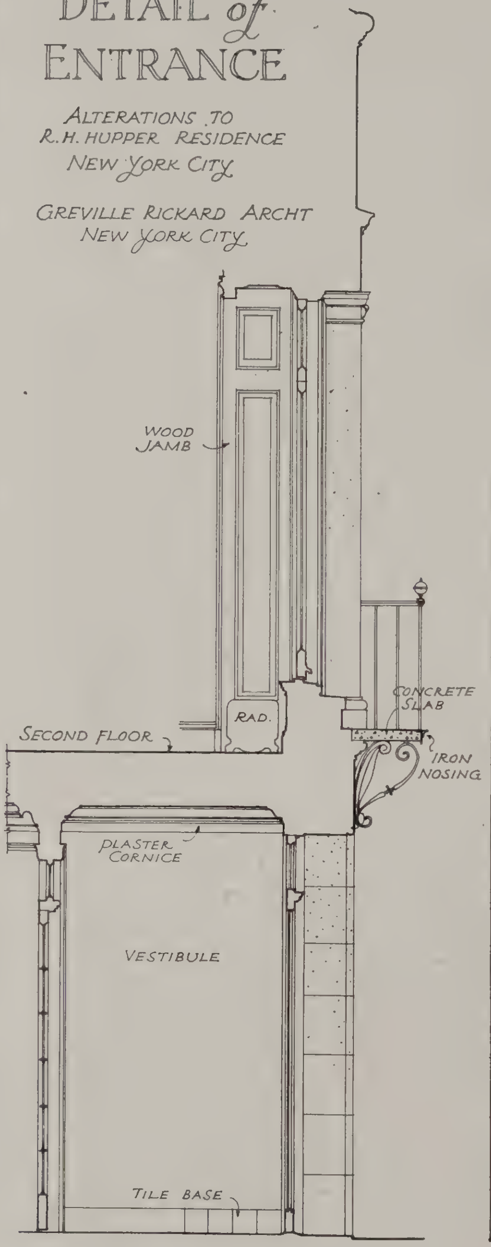

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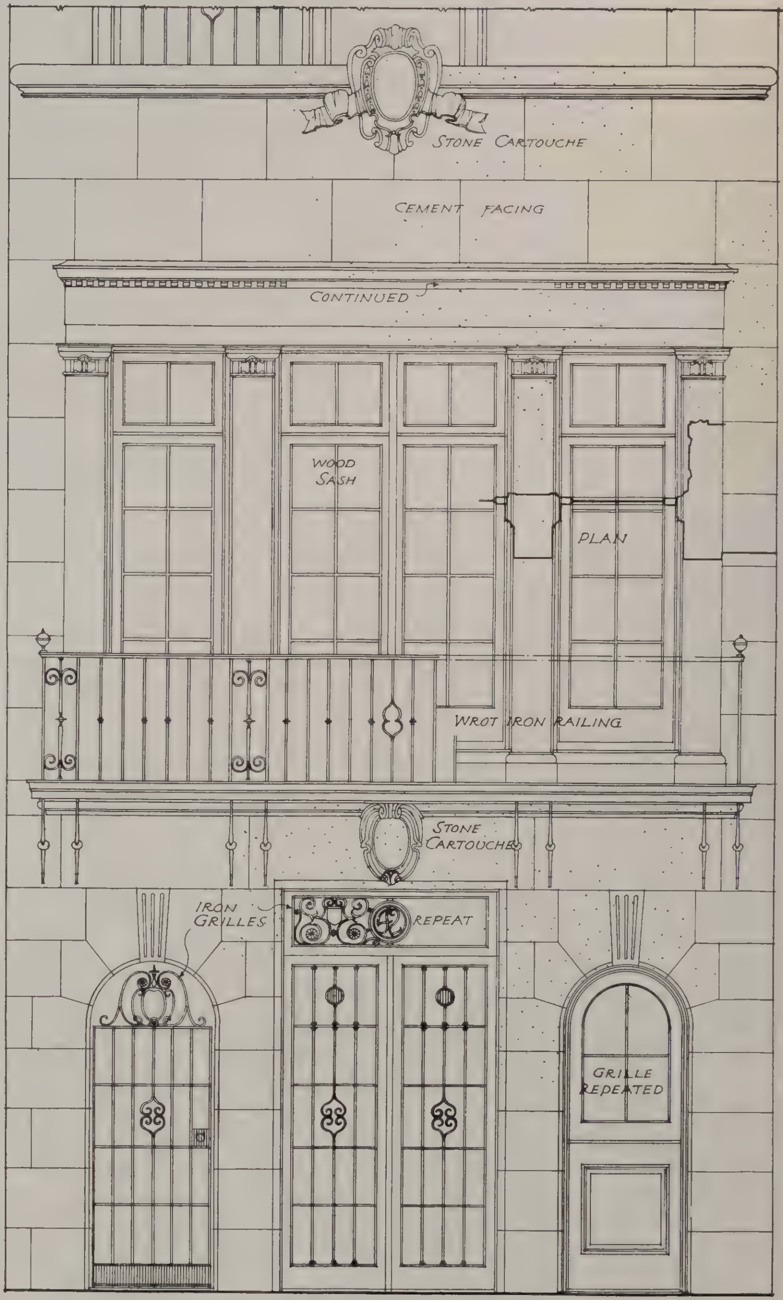

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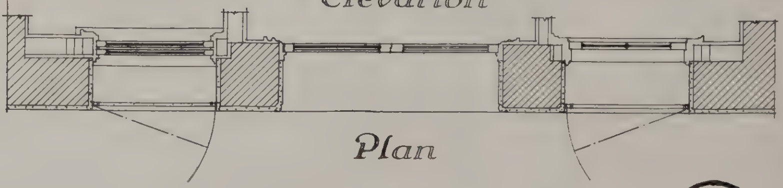

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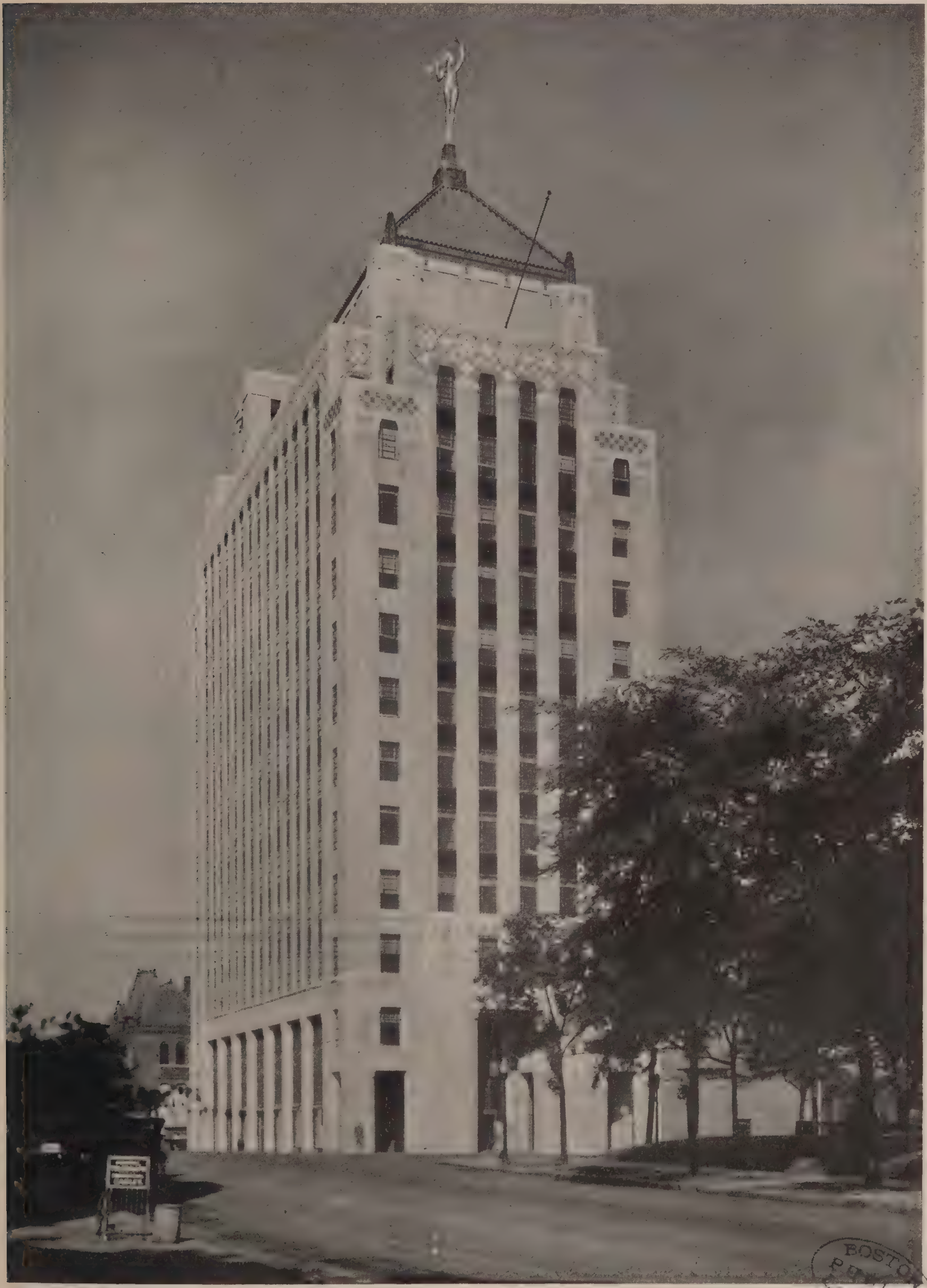

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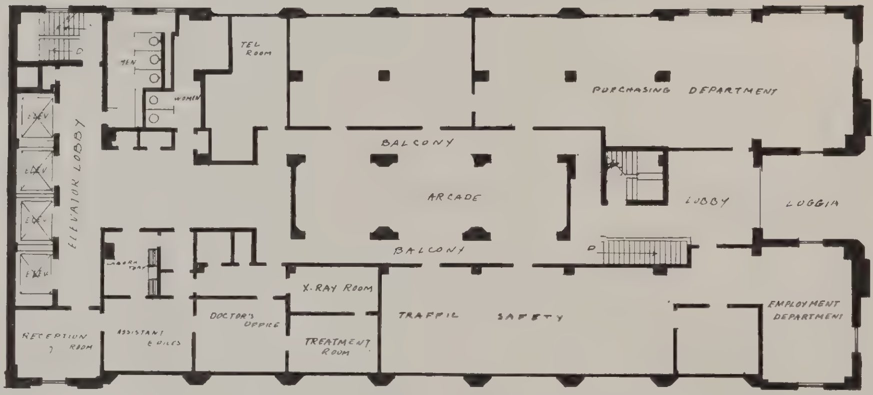
WARREN, KNIGHT & DAVIS, ARCHITECTS



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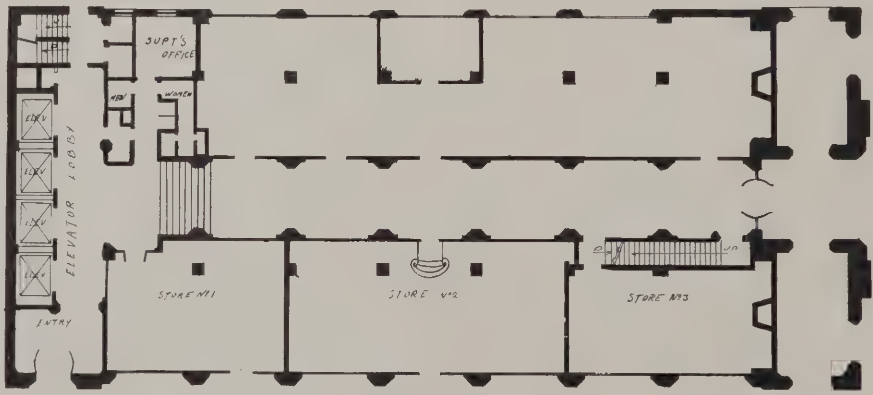

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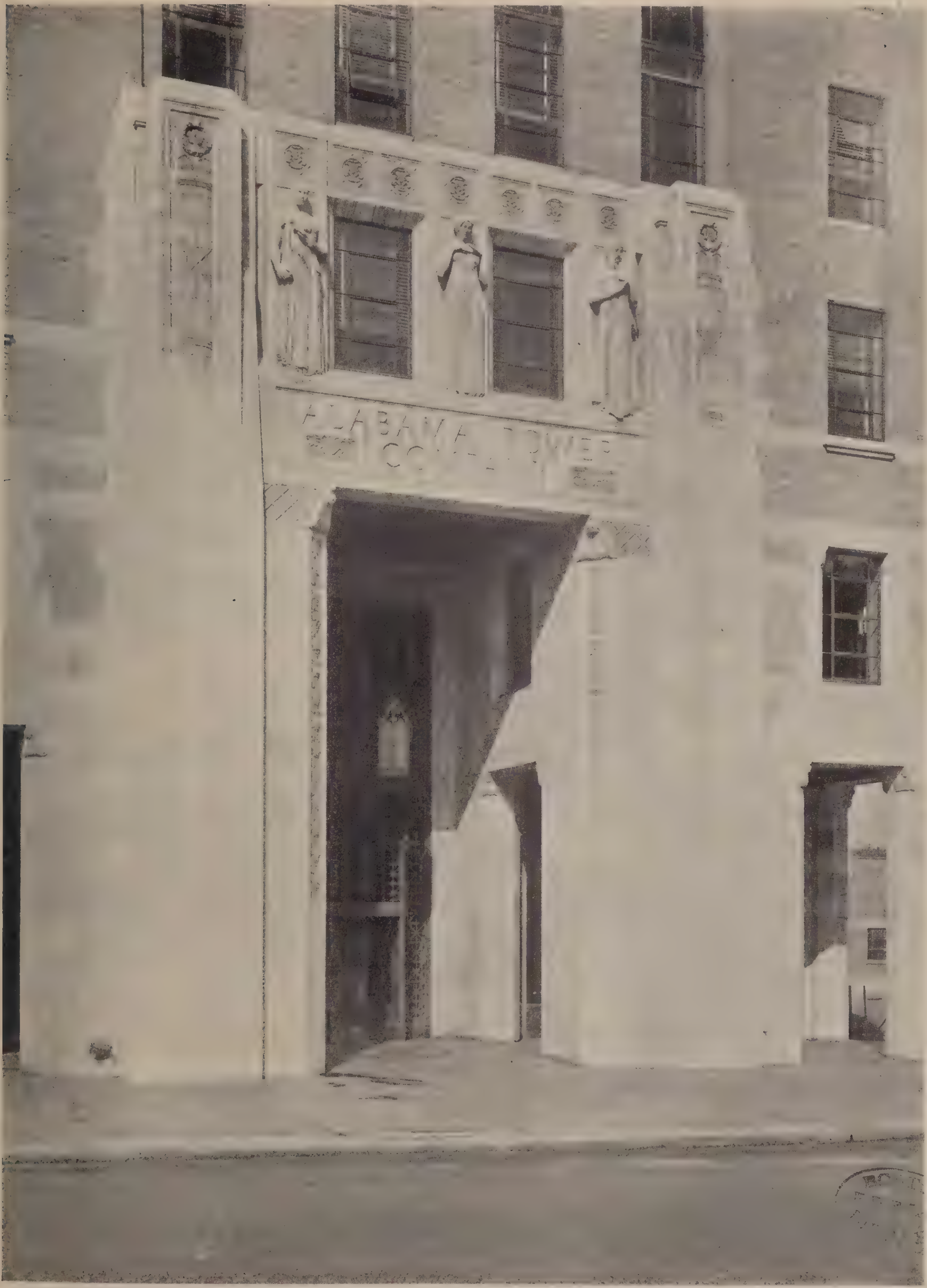

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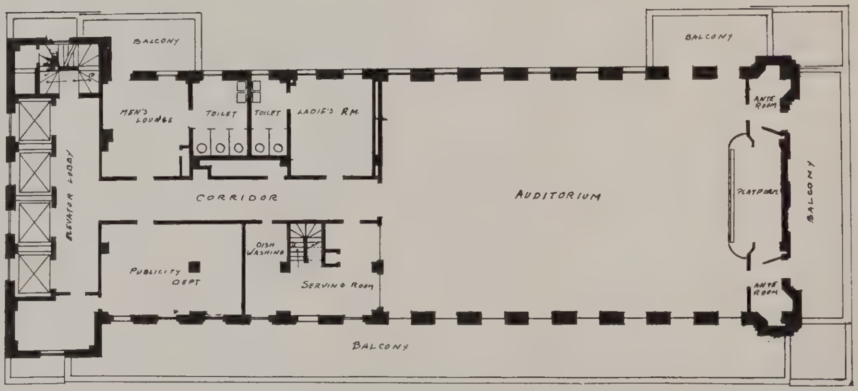
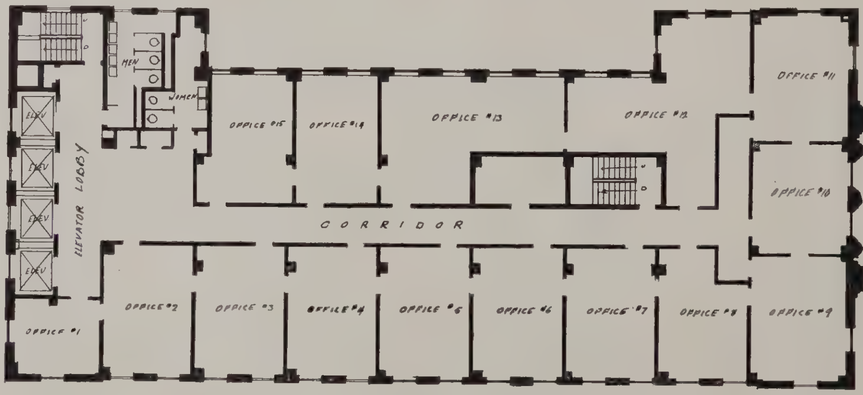


TOP FLOOR



A TYPICAL FLOOR

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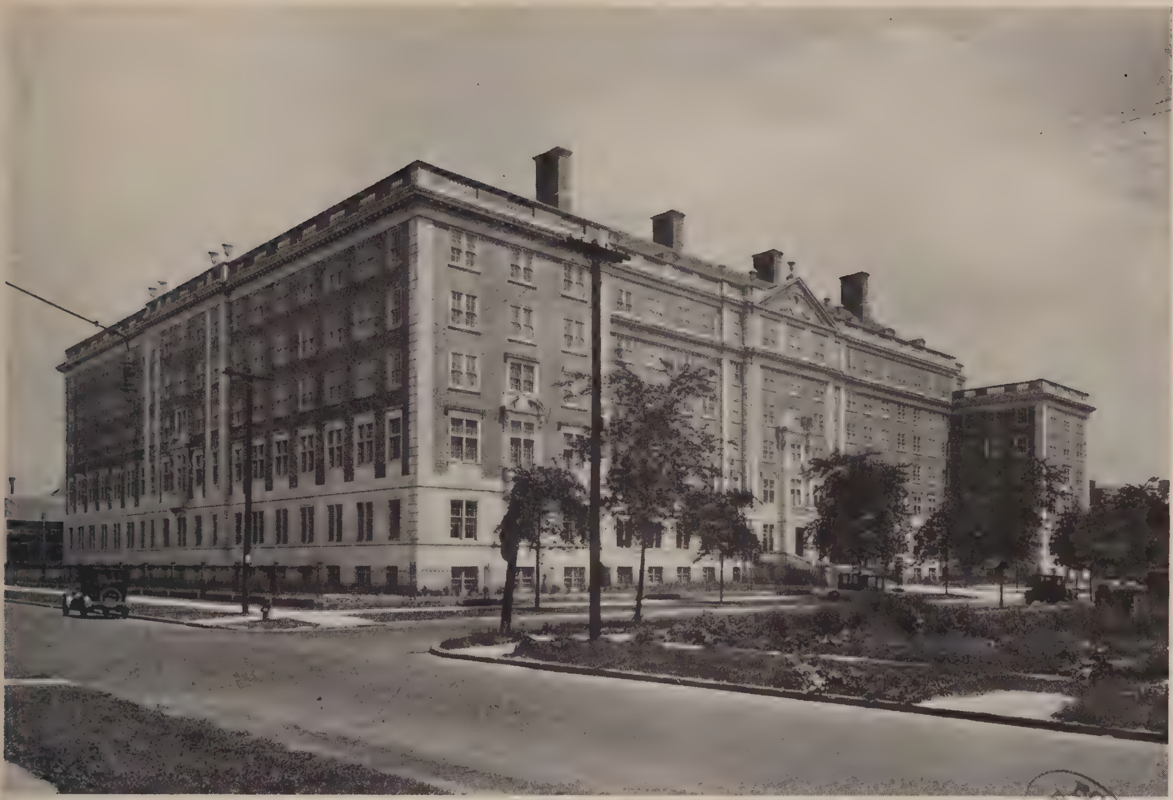

FRONT ELEVATION

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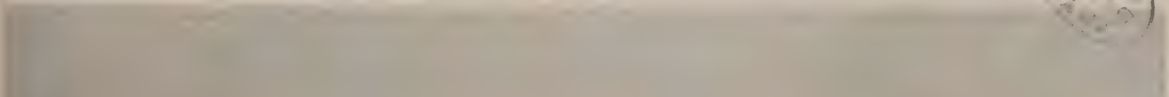


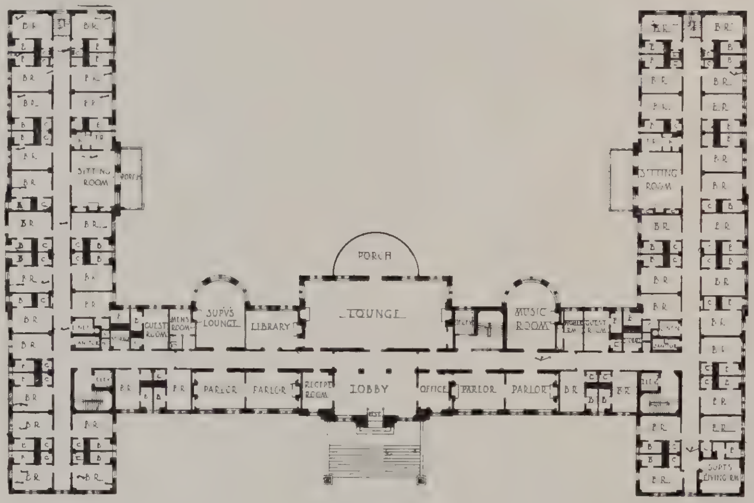
Photos. Thomas Ellison

Plans on Back

GENERAL VIEW

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS



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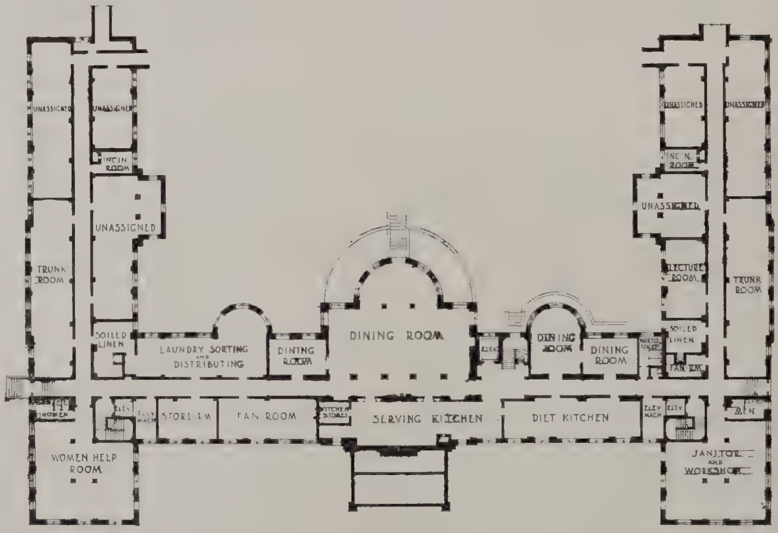

BASEMENT FLOOR

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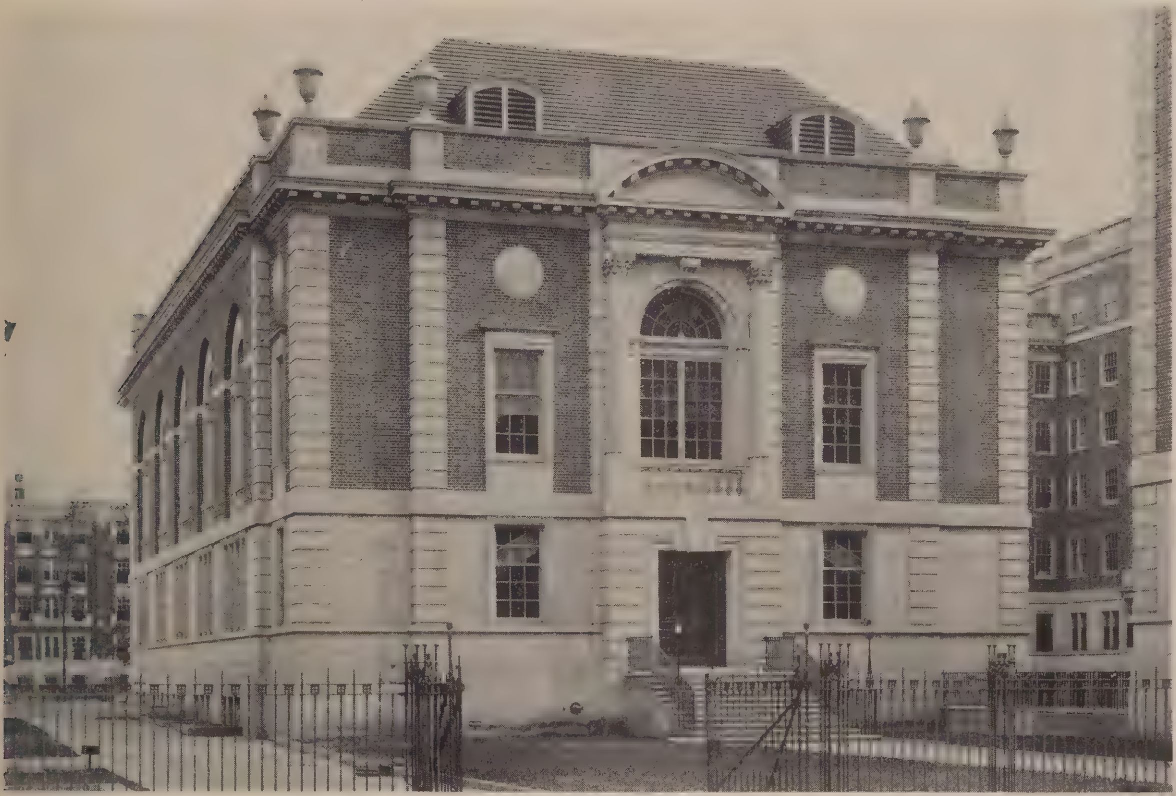
ALBERT KAHN, INC., ARCHITECTS



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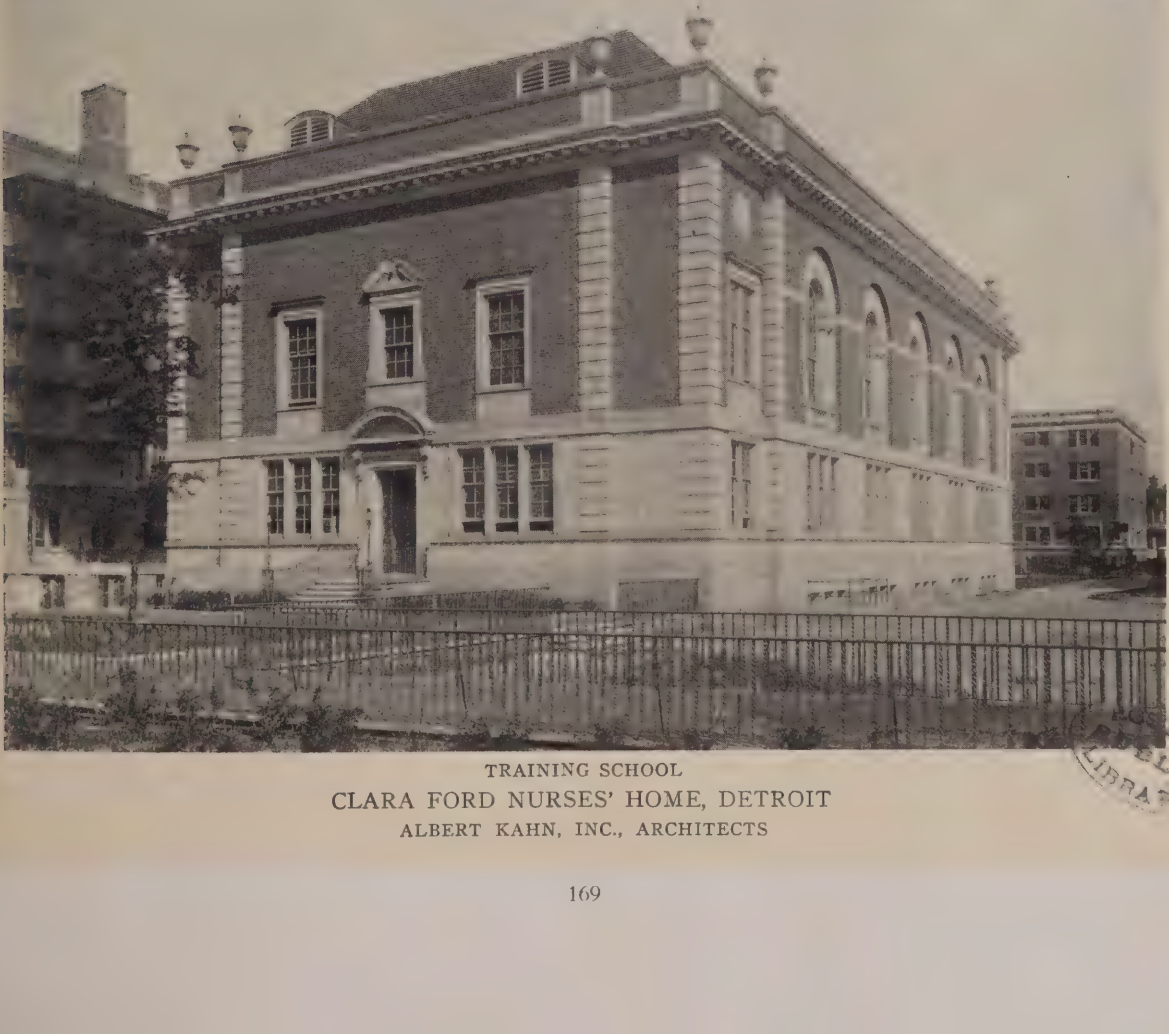

TRAINING SCHOOL

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS

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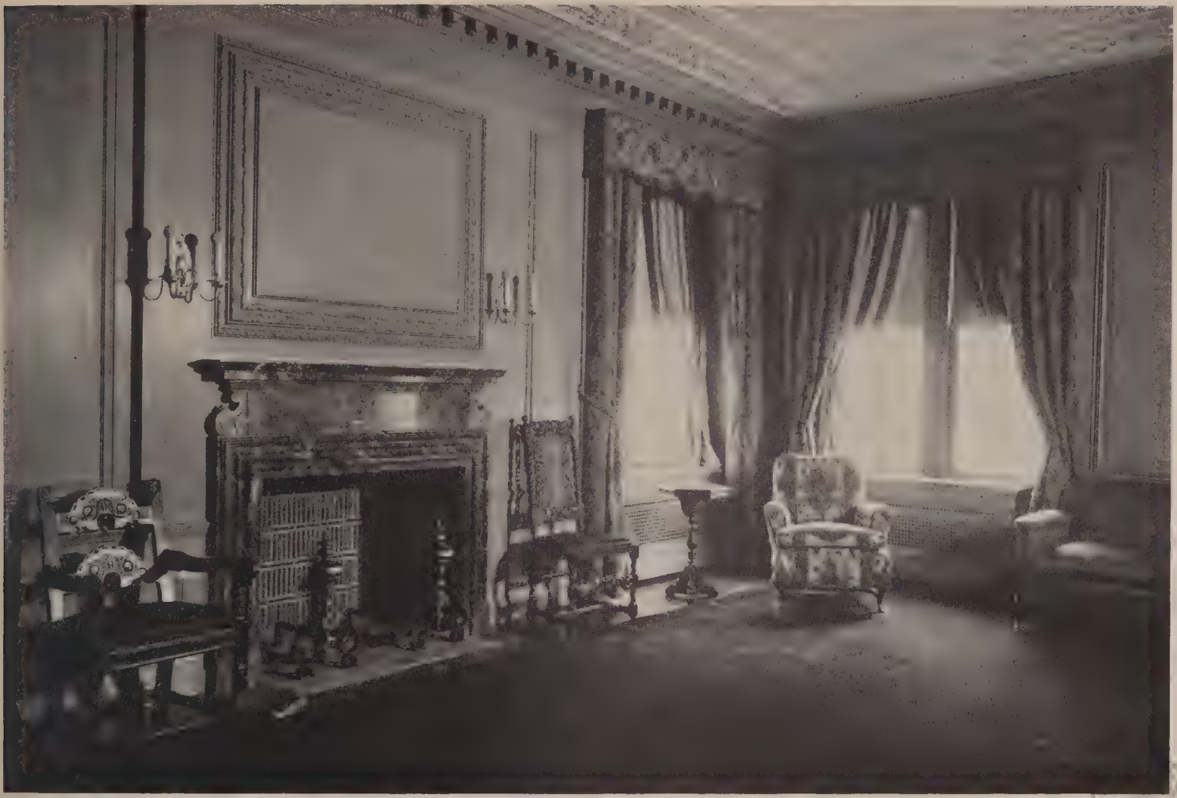
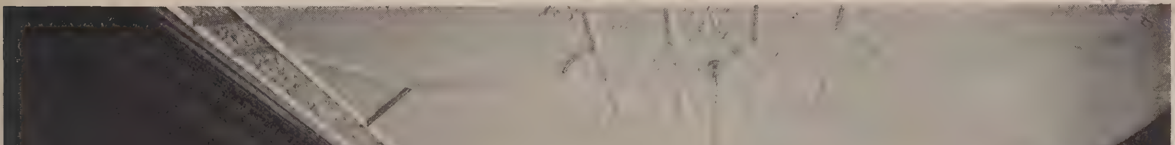


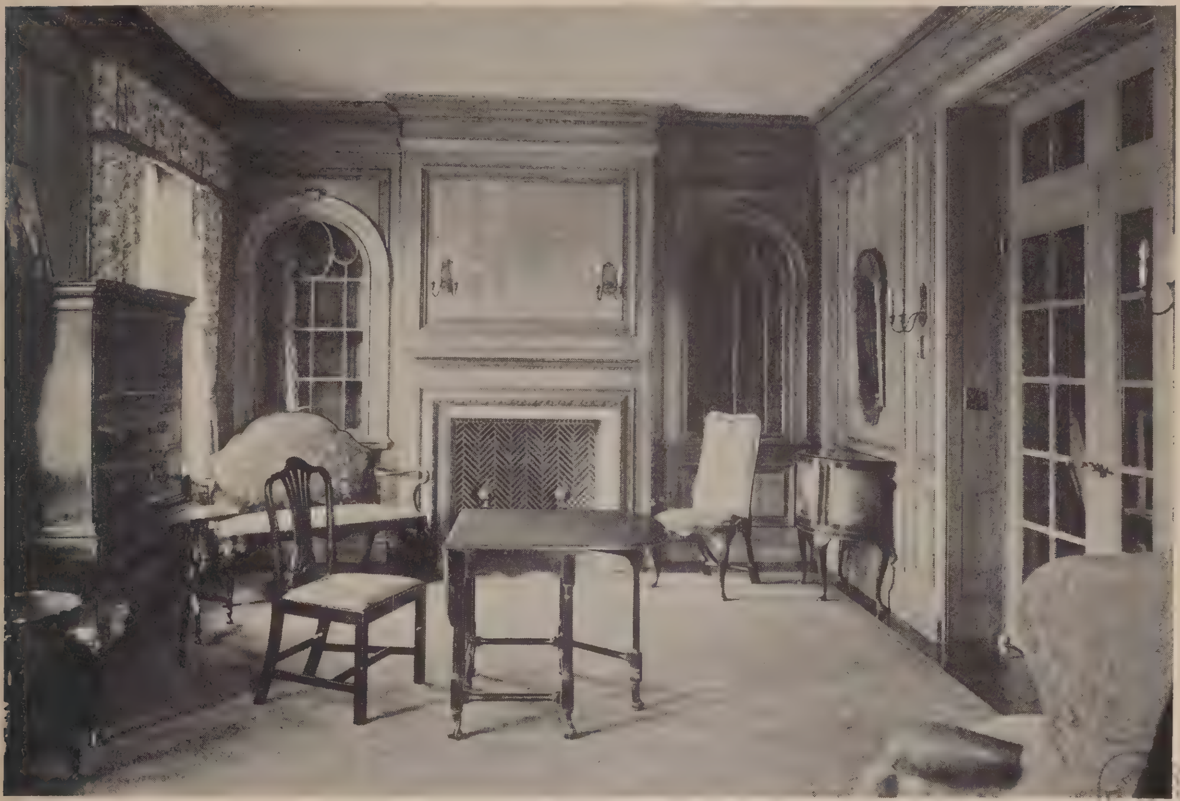
MAIN LOUNGE ROOM



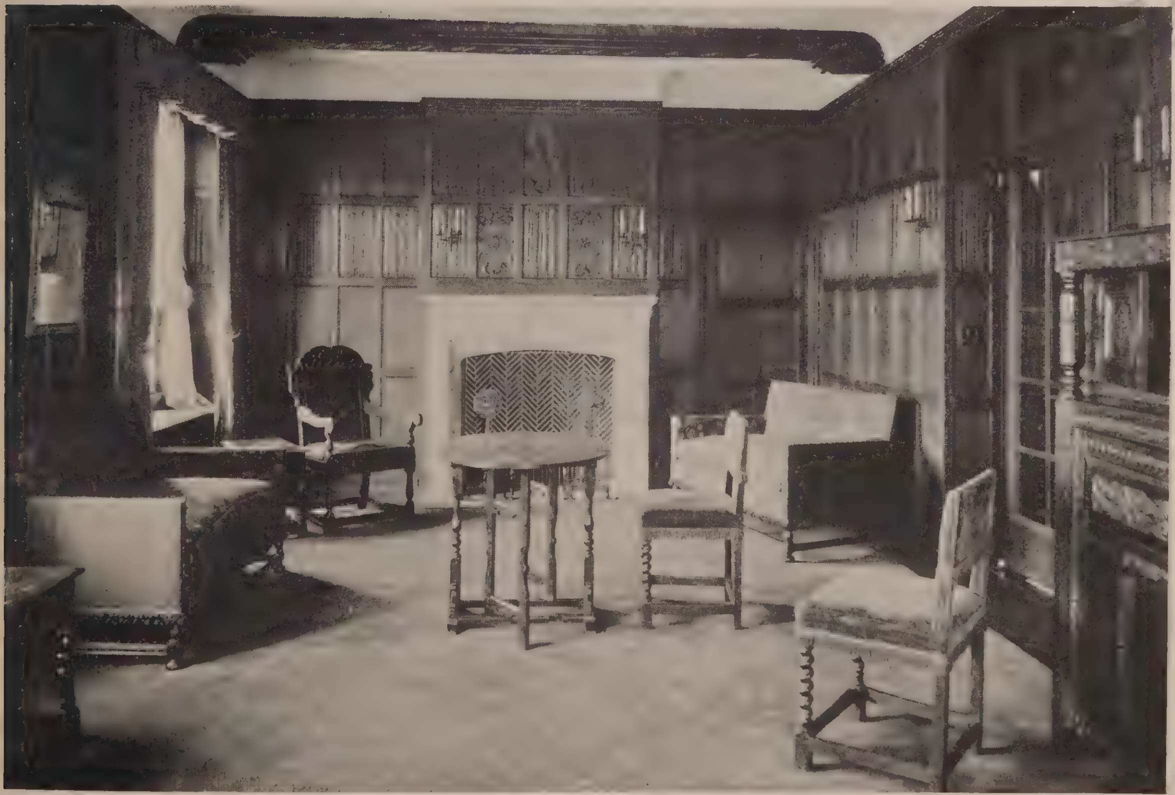
SUPERVISOR'S LOUNGE

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS



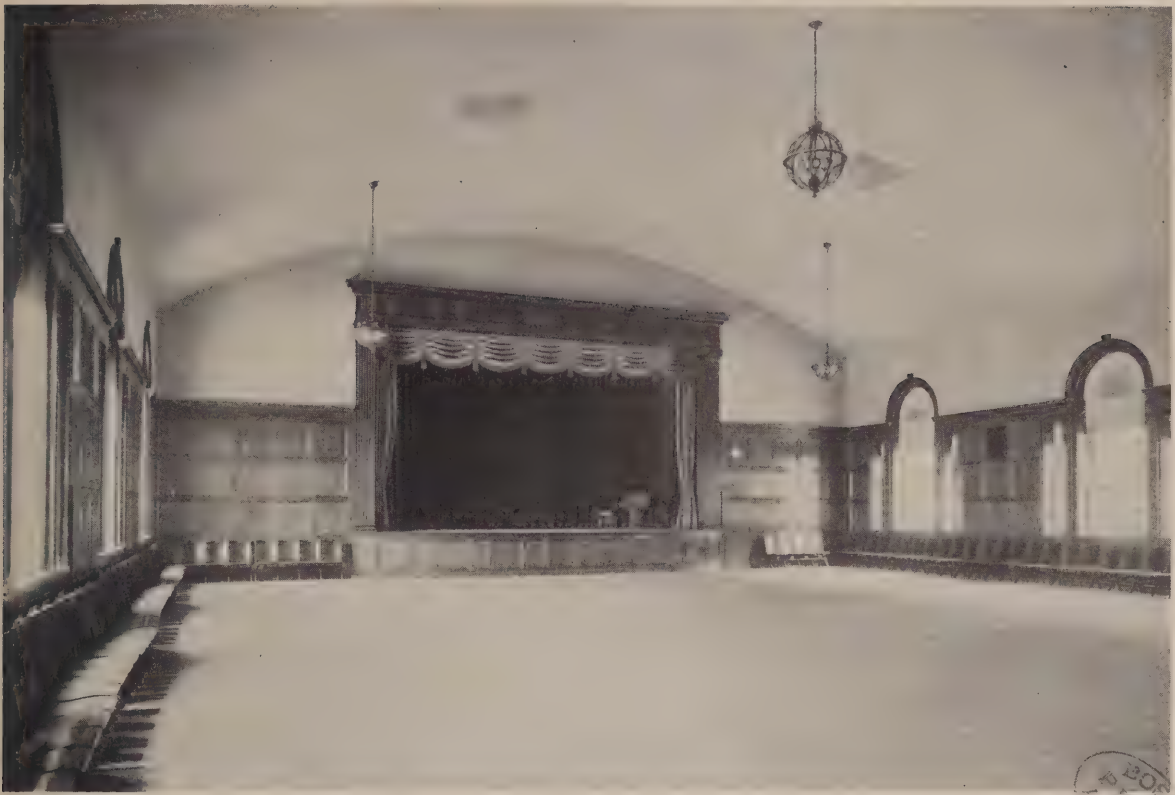
SMALL PARLOR



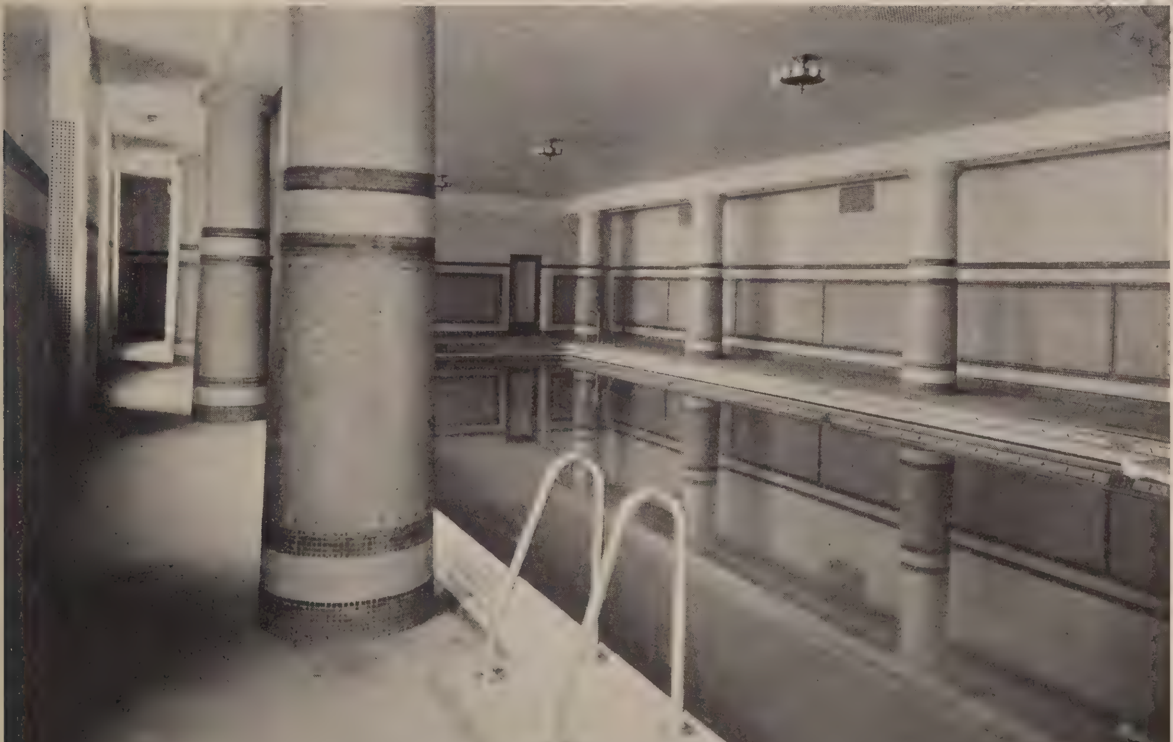
SMALL RECEPTION ROOM

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS



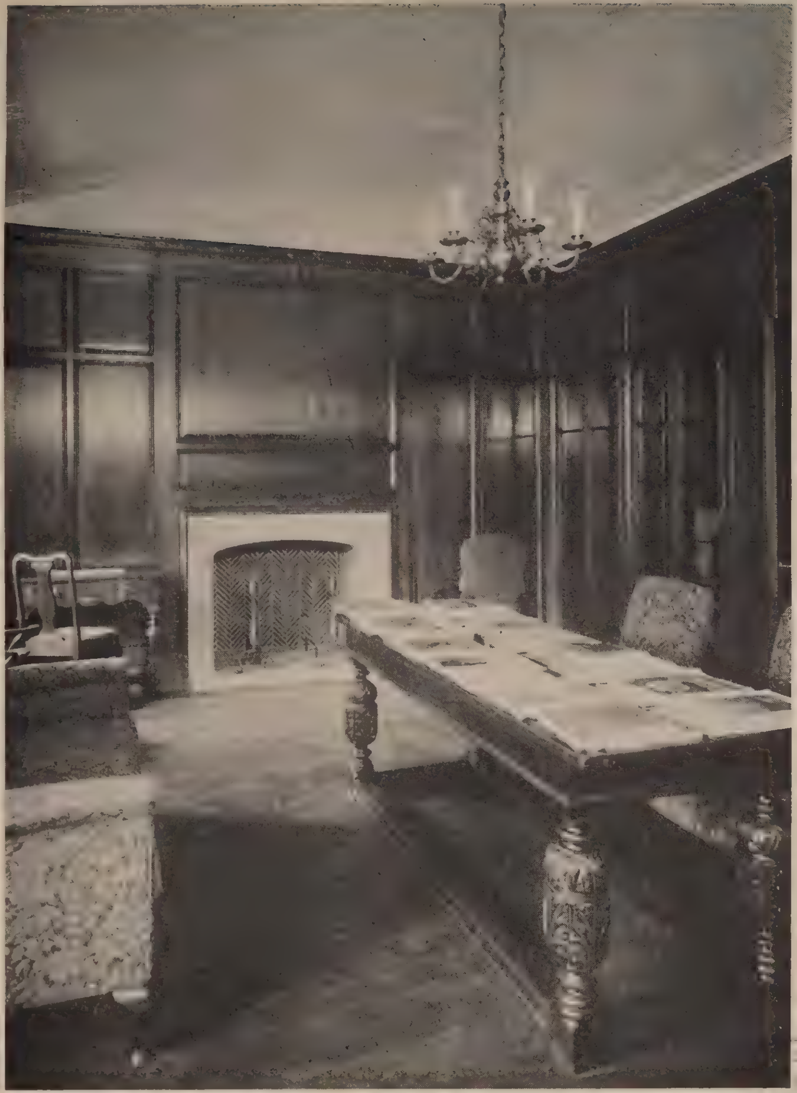
AUDITORIUM, TRAINING SCHOOL



SWIMMING POOL, TRAINING SCHOOL

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS



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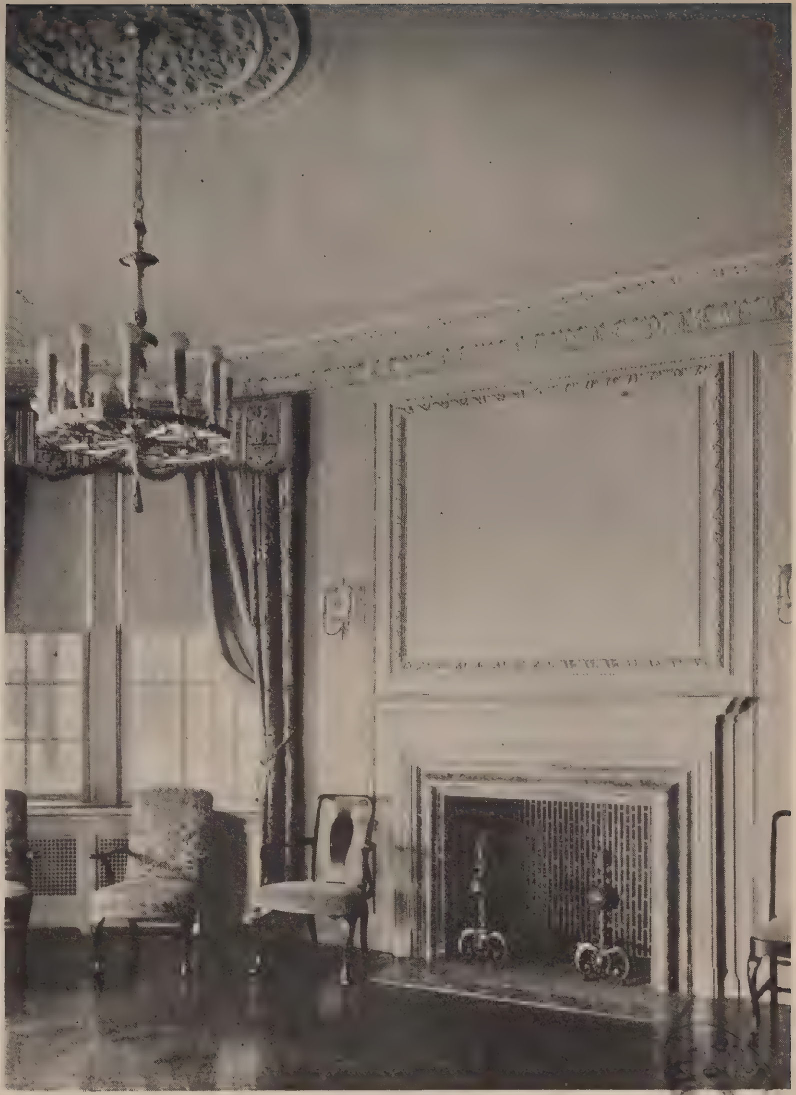
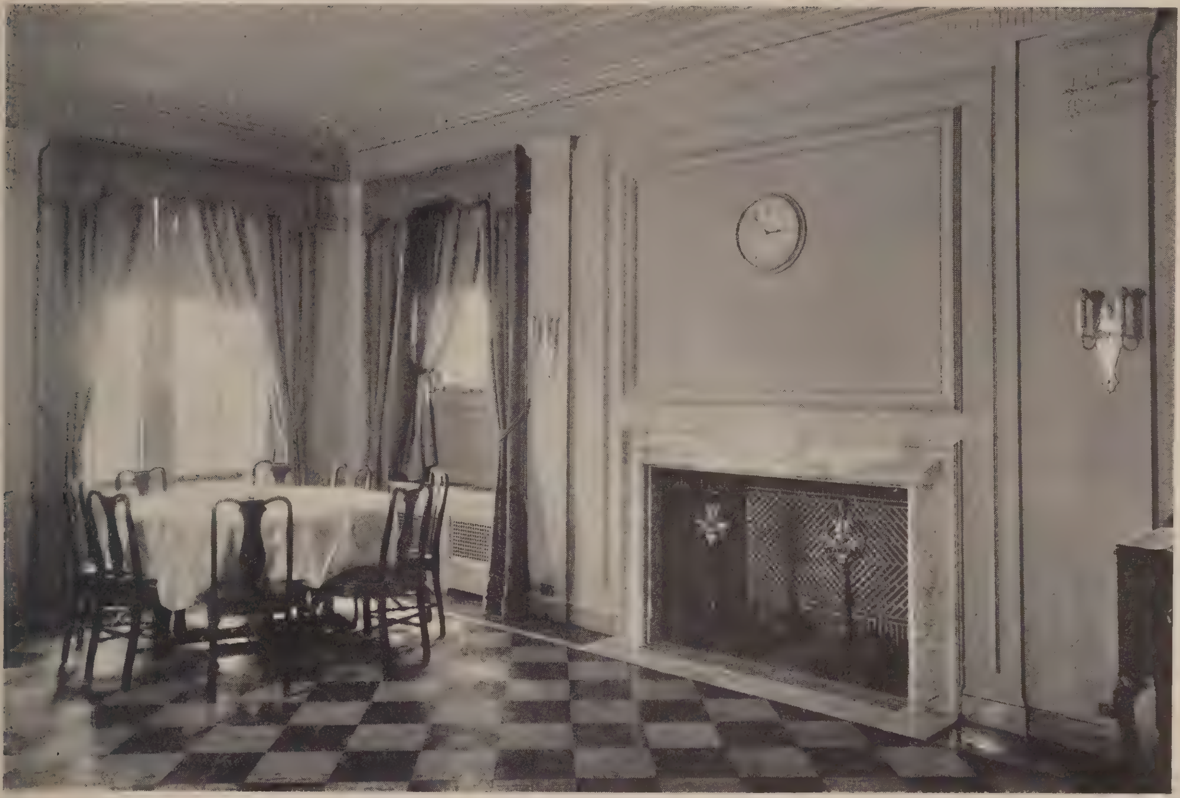


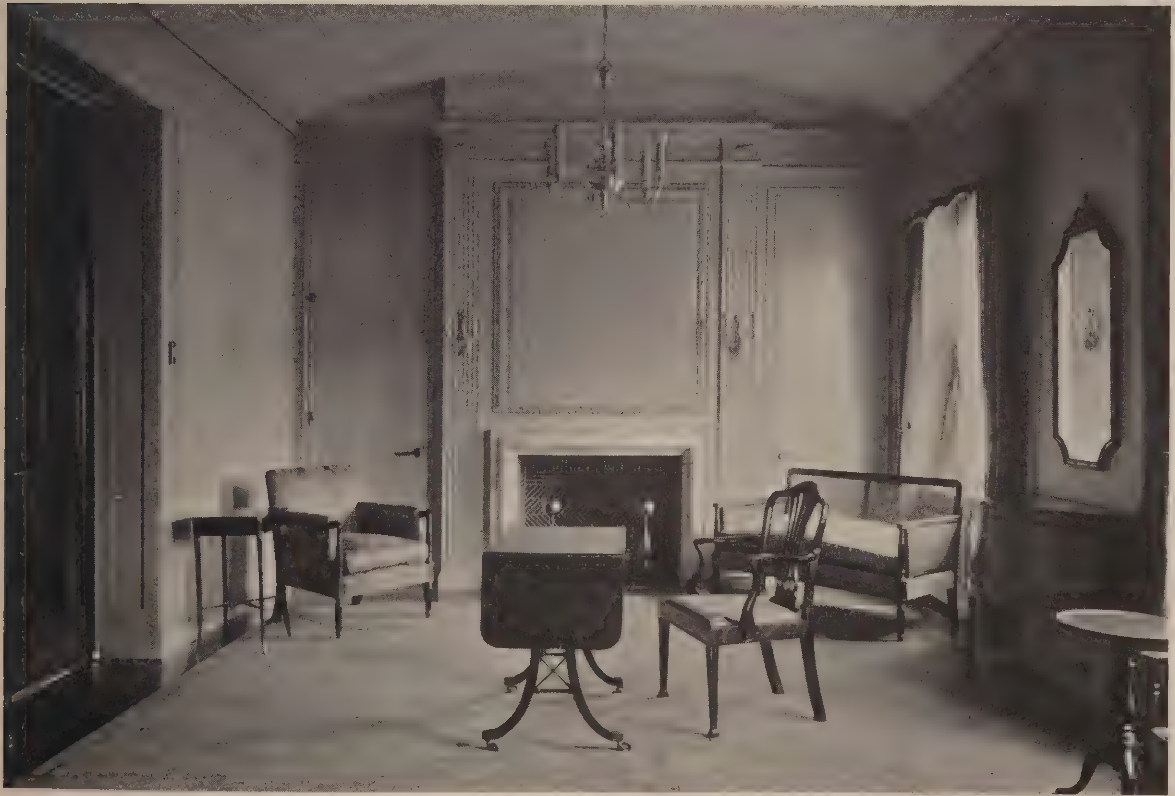
MUSIC ROOM

CLARA FORD NURSES' HOME, DETROIT

ALBERT KAHN, INC., ARCHITECTS



DINING ROOM



SMALL PARLOR

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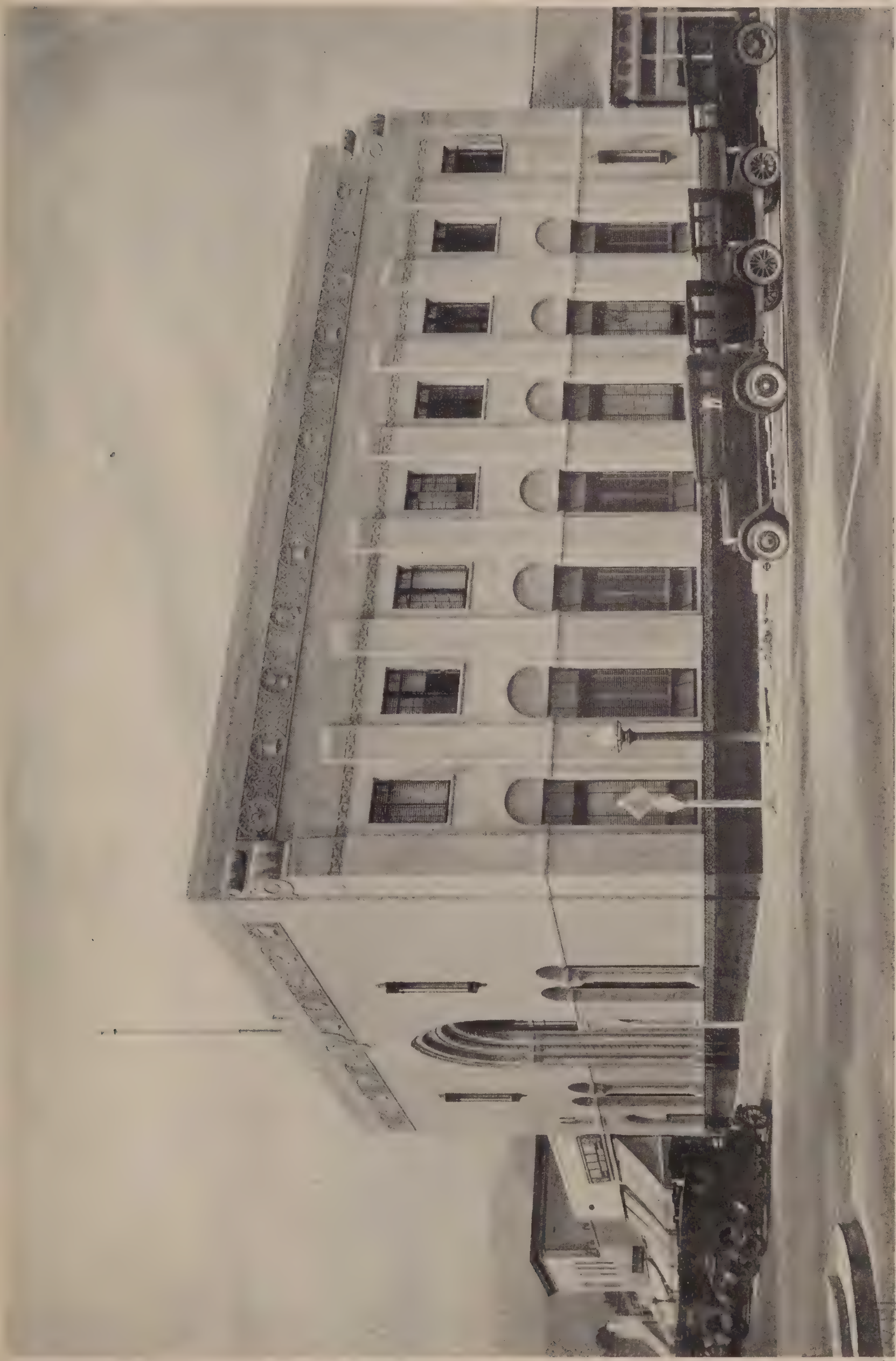
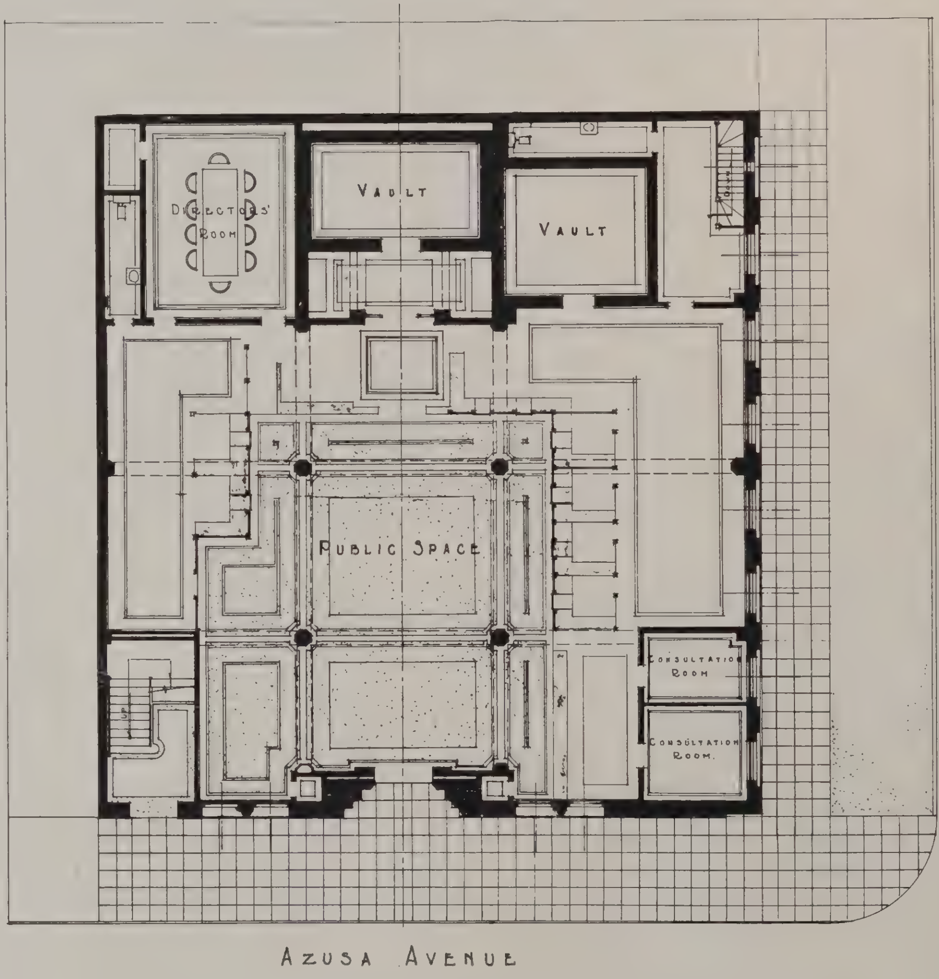


Photo. The Mott Studios

Plan on Back

FIRST NATIONAL BANK, AZUSA, CAL.

ROBERT H. ORR, ARCHITECT



PLAN: FIRST NATIONAL BANK, AZUSA, CAL.
ROBERT H. ORR, ARCHITECT

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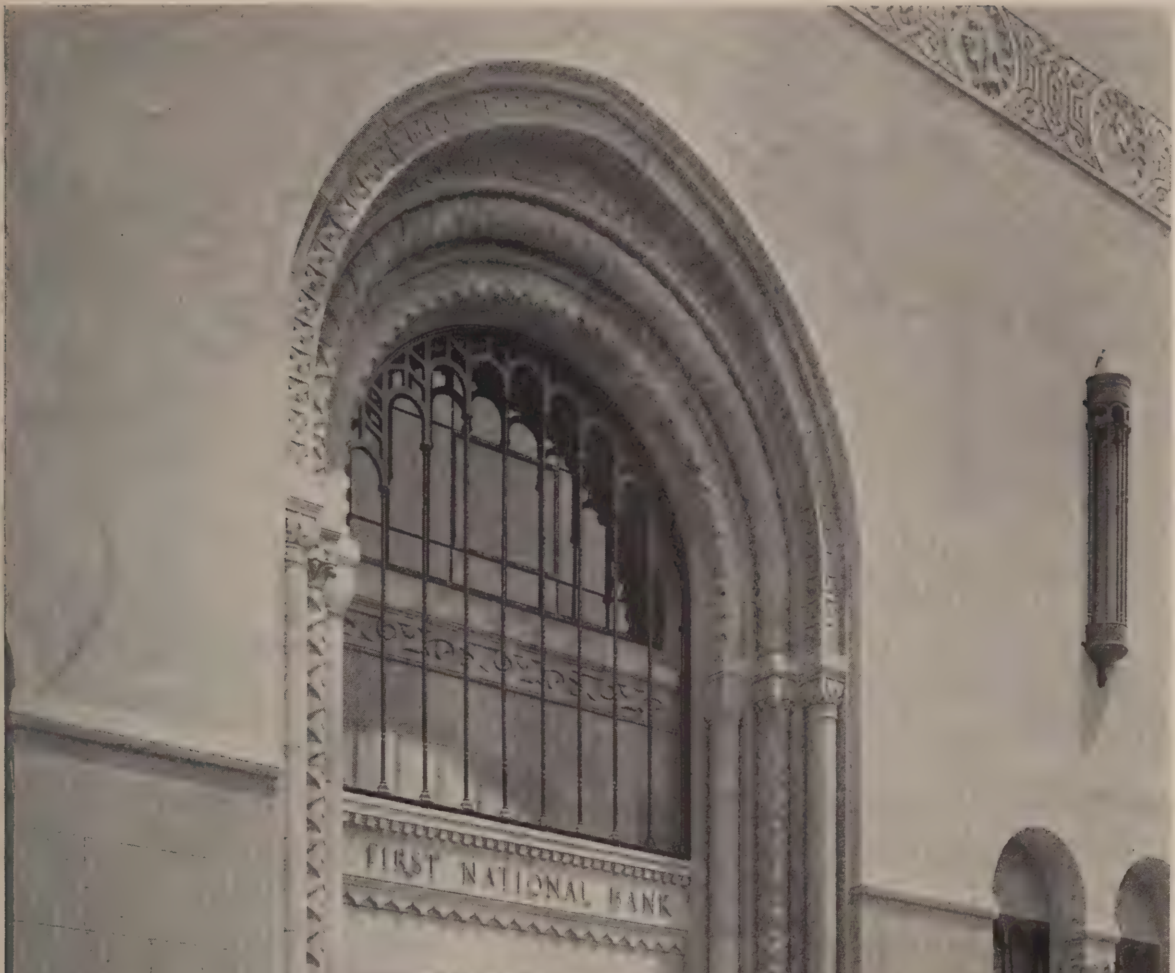

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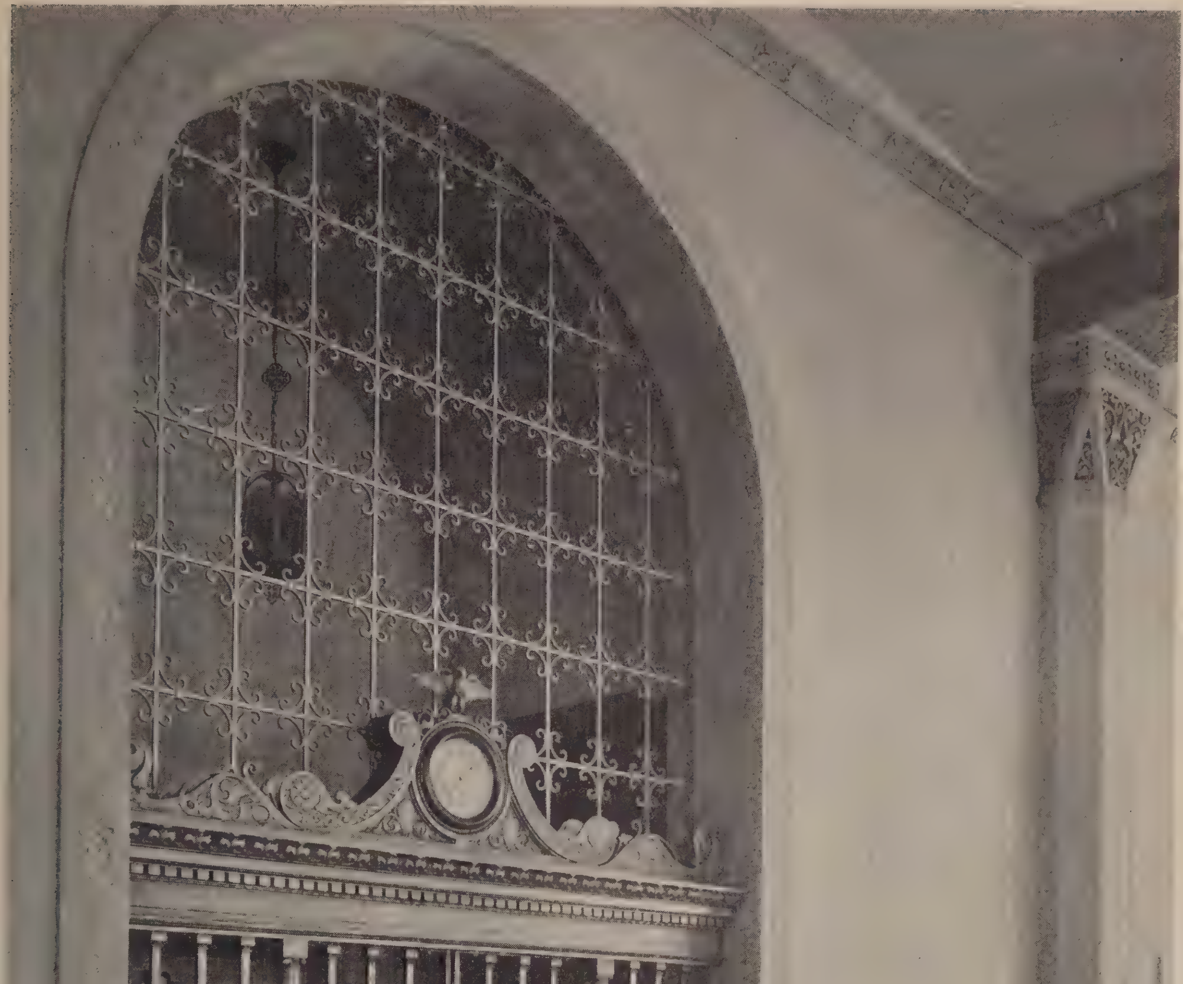
ROBERT H. ORR, ARCHITECT



ENTRANCE TO VAULT
FIRST NATIONAL BANK, AZUSA, CAL.
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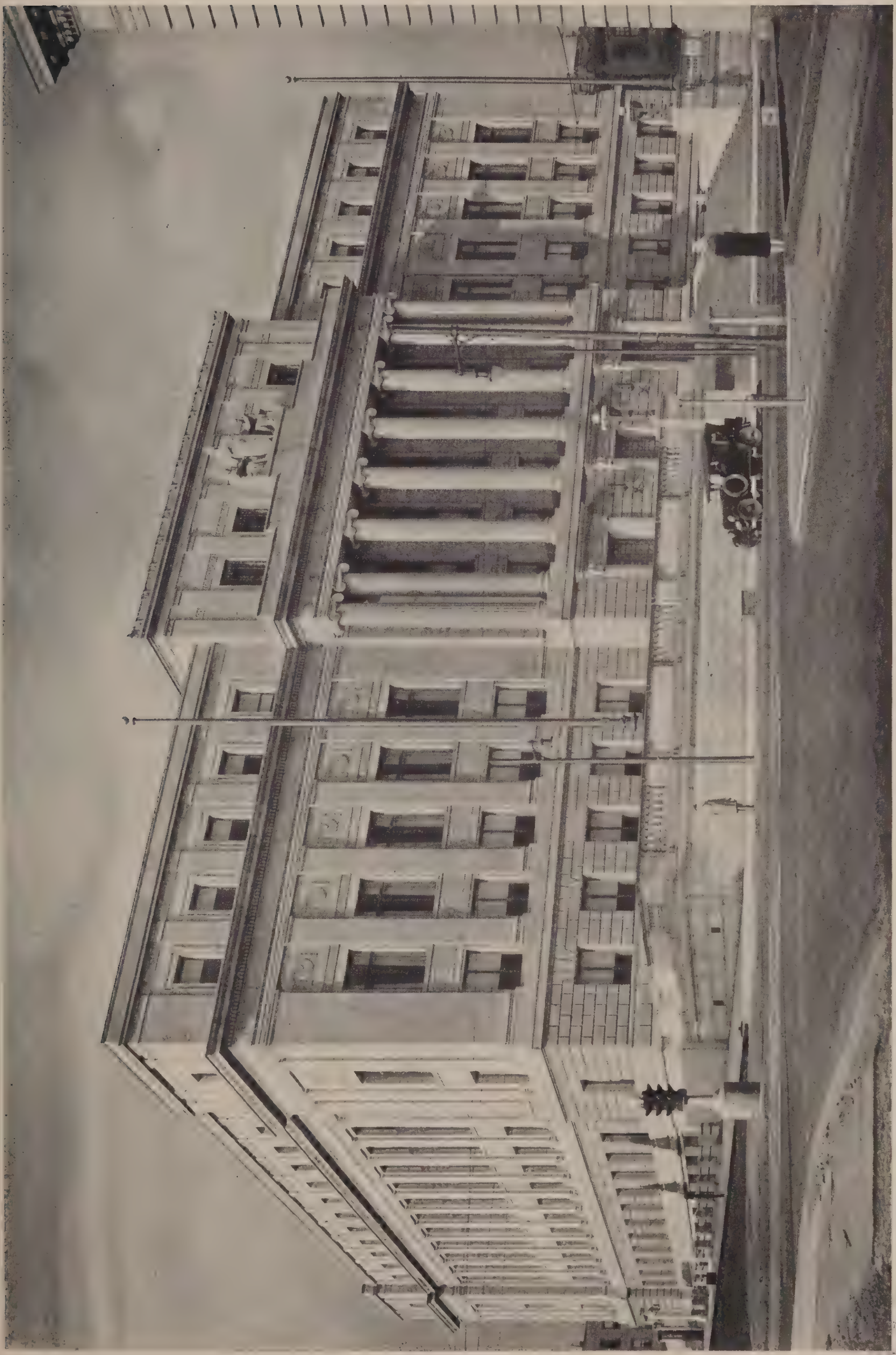
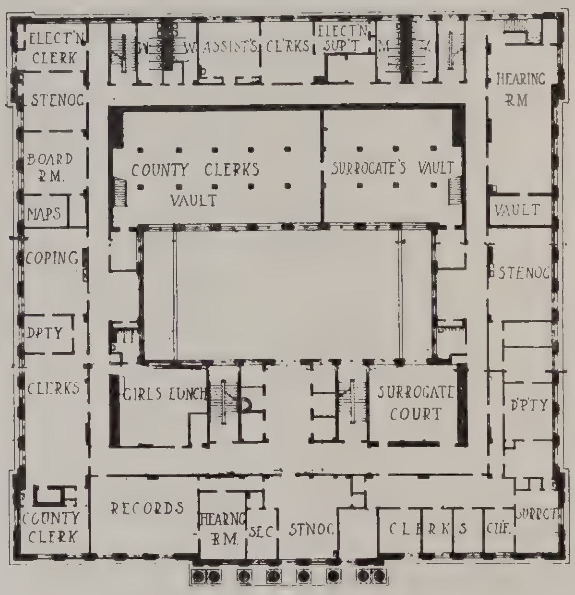


Plans on Back

ESSEX COUNTY HALL OF RECORDS, NEWARK
GUILBERT & BETELLE, ARCHITECTS

Photos. P. A. Nyholm



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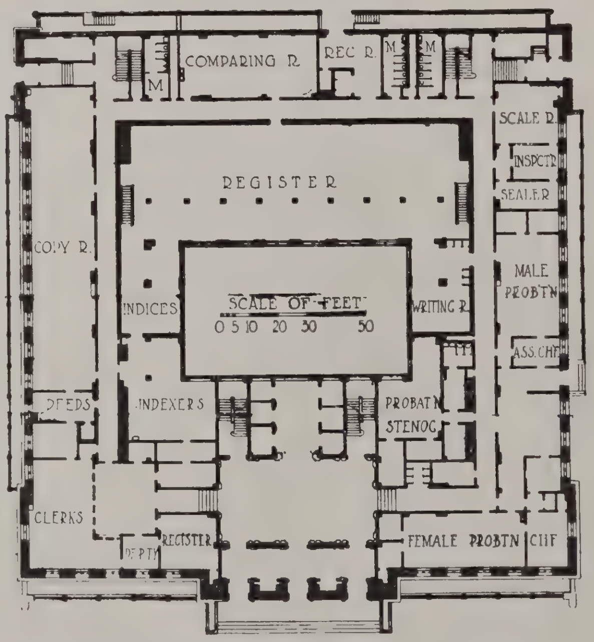
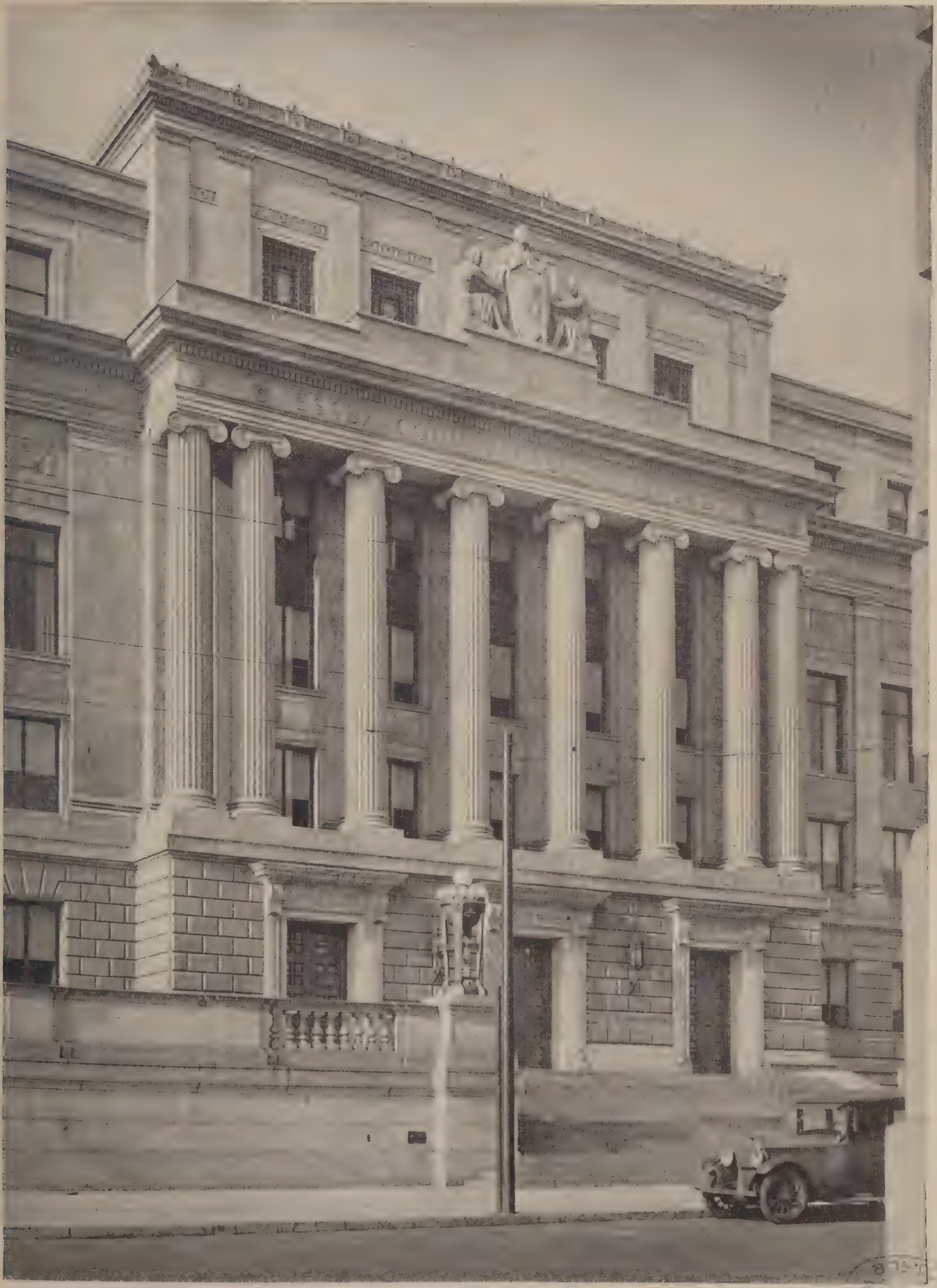
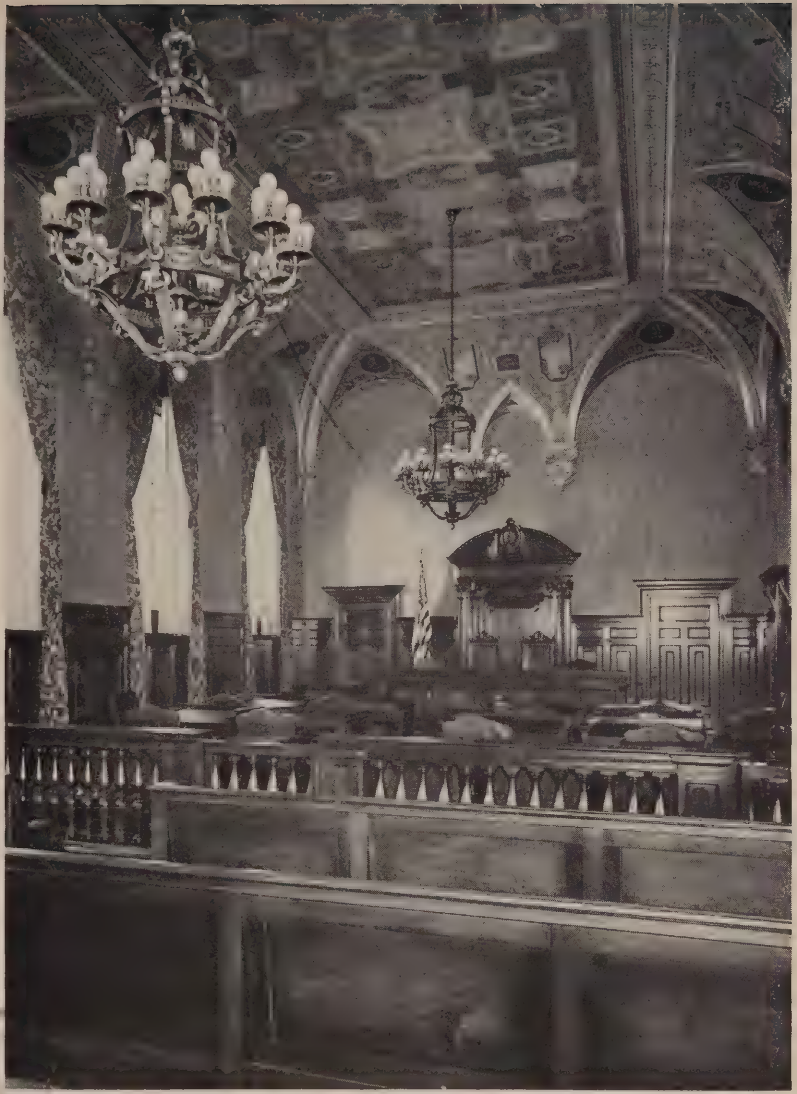


FIRST FLOOR

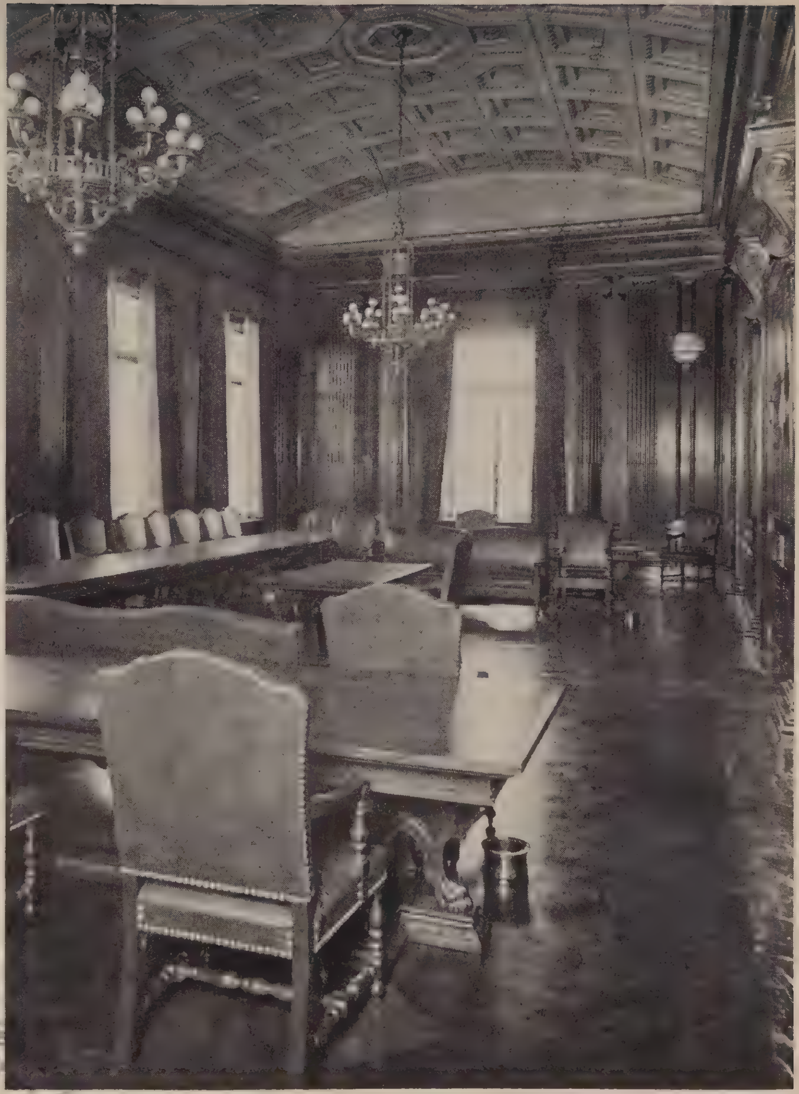
PLANS: ESSEX COUNTY HALL OF RECORDS, NEWARK
GUILBERT & BETELLE, ARCHITECTS



CENTRAL BAY
ESSEX COUNTY HALL OF RECORDS, NEWARK
GUILBERT & BETELLE, ARCHITECTS



BOARD OF FREEHOLDERS' ROOM



GRAND JURY ROOM

ESSEX COUNTY HALL OF RECORDS, NEWARK

GUILBERT & BETELLE, ARCHITECTS

THE DETROIT INSTITUTE OF ARTS

WITH PREFATORY NOTES ON PHASES OF MUSEUM THEORY AND PRACTICE DEMONSTRATED IN ITS NEW BUILDING

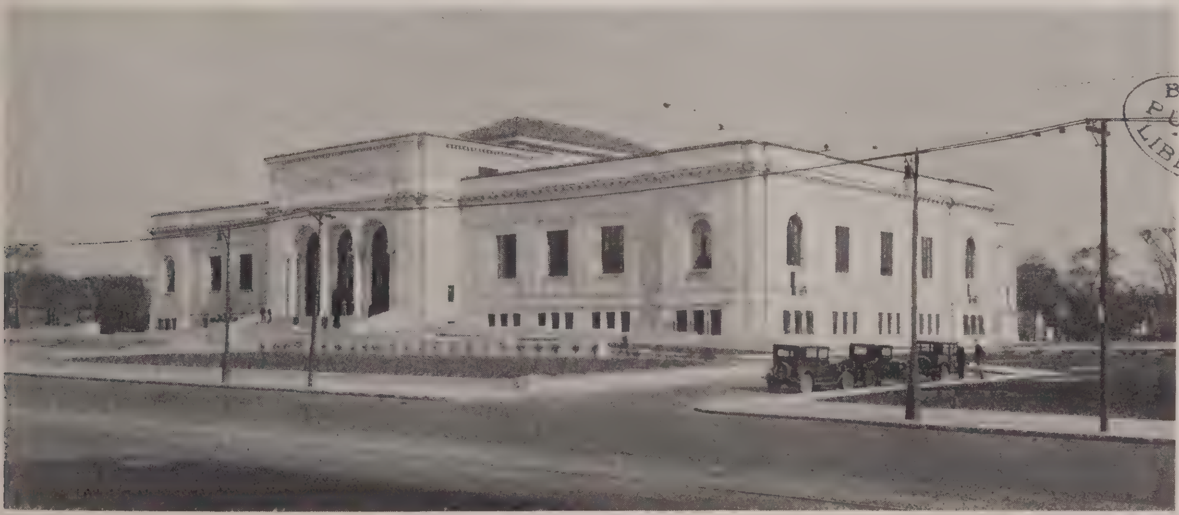
BY

RICHARD F. BACH
OF THE METROPOLITAN MUSEUM OF ART

IT is a curious anomaly that an architect may reasonably be expected to design his building "from the inside out," but in its erection must build "from the outside in," the interior frequently being considered a legitimate stamping ground for decorators, painters and other artists, building committees, politicians and interested parties generally, not excluding the prospective occupants themselves. There are exceptions—usually public buildings of various kinds, churches, railway stations, sometimes libraries or schools—in which the word of the architect is definitive within the edifice as well as in its exterior. There is, however, but one kind of building in which his skill in design may be,—in fact, under certain conditions definitely must be,—called upon to furnish both background and complement for inanimate occupants, these varying endlessly as to the time of their origin, as to type, yet necessarily brought into harmony within their own ranks and with their new domicile.

This difficult task and real opportunity for thoughtful design is found only in the museum. Museums have much in common as to work and public relationships, whether they are devoted to art, science, history, civilization, engineering or industry, or to any one of the individual arts, sciences, processes or kinds of human effort or education which these embrace. Generalizations on the broad subject would be illuminating, and once made—as they are bound to be by practical demonstration of theory in numerous museum buildings now under way—may well constitute a workable point of departure for any discussion of museum buildings. Our interest here is in the museum of art, and particularly in one interpretation or expression of its cardinal function of effectual exhibition.

Now, whether or not the architect is called upon, in the museum of art, only for impressive architectonic effects in formal, public or semi-public interiors; whether his meticulous orders, studied ornament and stylistically accurate cornices are to be limited to vestibules, stairways and loggias; or whether he is enlisted as an auxiliary in the actual installation of exhibits, will depend upon two things: first, the school of museum theory and practice favored by the staff of the institution in question; second, the capacity of the architect himself to appreciate the needs and functions of museums and his ability to interpret the theory of display to be carried out. On the latter of these considerations much might be, and elsewhere has been, said. We take refuge in the comprehensive and accurate statement by Henry W. Kent, Secretary of The Metropolitan Museum of Art, in THE FORUM for December, 1927. Suffice it here to say that in the degree that museums in their new guise, namely, as elements in the cultural (educational as well as inspirational) upbuilding of the community, become more numerous and effective, the architect will be relied upon to



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The Detroit Institute of Arts
Paul Philippe Cret and Zantzinger, Borie & Medary, Architects

interpret satisfactorily their new functions and in his buildings to make feasible their difficult and now widely diversified activities. At present, with the customary brilliant exceptions, the architect has barely touched the problem; its growing insistence and the progress of thought on the subject generally will without question stimulate his interest and prompt his observation and study. For museums are destined to figure largely in our roster of new buildings, and they offer him a functional problem as practical and often as troublesome as that of the library or the school building; and they may, ere long, be included in the list of institutions which have taken cover in the tall building type. The possibilities of plan, design, illumination and so on offered by this prospect are alluring, to say the least.

Museum Display and Interior Design. Our other consideration is here especially significant, since the new building of the Detroit Institute of Arts is a definite demonstration of a type of display in which a skillful architect has been the abetter. This aspect of the general problem of museum design is of paramount importance to architects, not only because it may affect,—indeed materially control,—all or most of the interior design of art museum buildings, but also because the type of display favored at Detroit makes undeniable demands upon the architect to understand fully certain phases of museum theory. A word or two regarding these may be appropriate at this point. Museums have their business and their administration, their practice and their theories as do other forms of organized human effort. But as institutions of public service, museums have only recently come into the running. They are now developing a technique and methodology, to borrow good words from other fields, and these are calculated to serve as guides for the architect as well as for the museum official.

There is not in the vocabulary of museum work an equivalent in value to words like "teacher" or "educator" or "librarian," whose meaning is publicly understood,—no word to replace the ponderous description "museum worker," nor is there a general word to cover the whole field of museum work, acquisition, exhibition, management, education. The most important dictionaries give us only words like "museology," which means the science of arranging museums, or "museography," the scientific description of the contents of museums, or "museographist," one who writes on or classifies museum objects. In fact, the word museum itself, which we use to cover all types, in England, for instance, does not include "art galleries" where pictures are shown. This inadequacy of the language may imply lack of understanding of the type of building and work which the word museum connotes, or it may indicate nothing more than inexperience. Both would seem to be true, and the correction of the latter is making rapid strides to remedy the failings of the former. The statement is included here only to emphasize in fact of the youth of the museum of art in its current conception.

The firstlings of the museum of art are to be found in private collections, and these are hardly poor men's playthings. Such collections imply important buildings, usually the palace, hotel, *palazzo,* villa or other residence of the owner, wherein he disposed his treasures to suit his taste or fancy and no doubt with an eye to making upon those who saw them such impression as was desirable of the owner's wealth, power and connoisseurship. Exhibition or display technique was not known and hardly necessary, public responsibilities non-existent. Larger palaces, to be sure, displayed important items in semi-public halls or galleries, using that term in its earlier meaning; but the decorative features had no different significance in the Palazzo Farnese than they had in the House of Pansa or the Temple of Luxor.

Due to various causes, among them war, revolution, confiscation, pillage and other expressions of international amity, many of these collections came into public hands, the method and tradition of housing them already established by their history. Many remained in their original palaces and were there added to. Slowly, very slowly, a theory of display was developed out of the facts of the material. Important buildings could not be abandoned, and new ones were too expensive. So we find various expedients relied upon to render the crowded objects visible, let alone to exhibit them well. Exigencies of space and, in general, the use of private living quarters for public display space, gave birth certainly to one museum feature of doubtful value that has run amuck in most museum plans and has cost endless sums in upkeep,—namely, the skylight. In fact, the type of reasoning, or lack of it, which prompts architects to think of museum and skylight as essential to each other, certainly of the former as inconceivable without the latter, might be text for an ample discourse on the reasonableness of design in architecture. The skylight was in the beginning and must remain, either a compromising makeshift or a basic error, depending on where it is found, and its feasibility in museums erected now should be carefully studied and thoughtfully restricted.

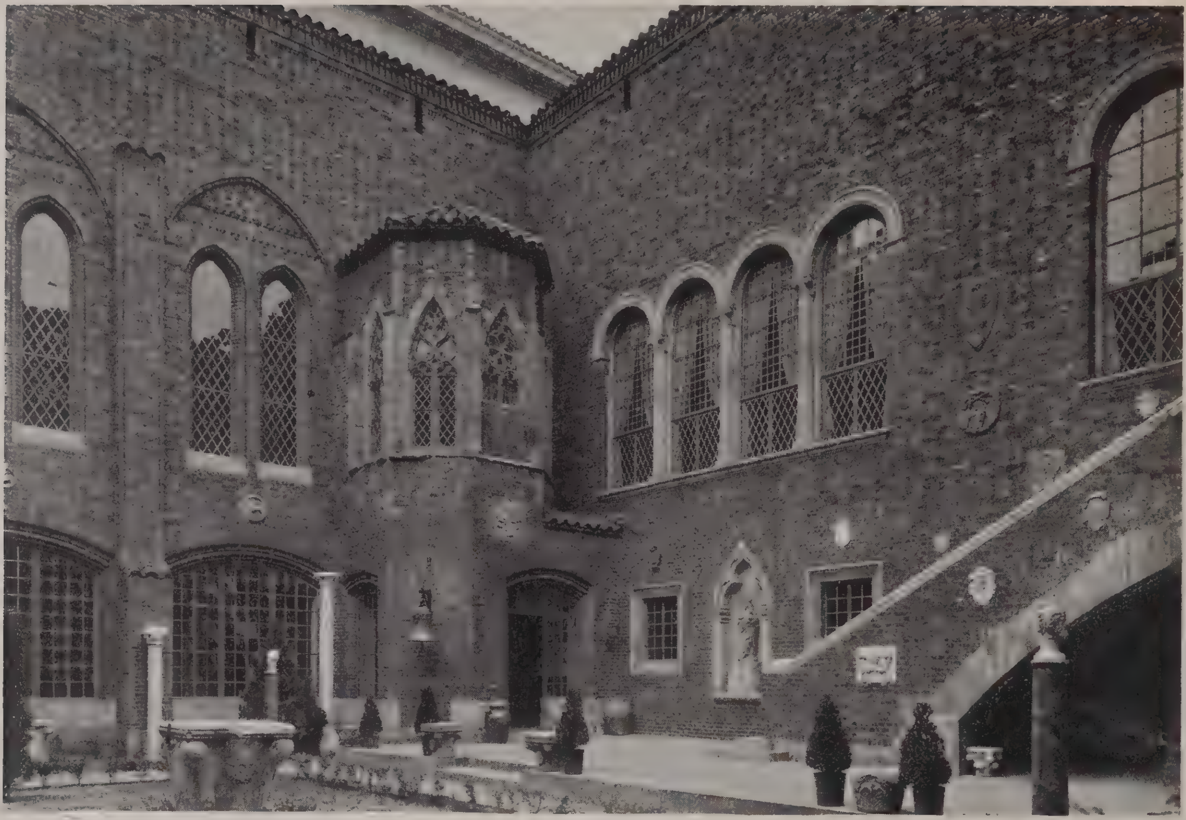
Period Style Display. The nineteenth century worked manfully at the task of devising ways and means of suitable display for this transferred material, expressing its findings in various directions indicated by possible answers to such leading questions as these: Shall objects be classed by material, by style, by race, or by cultural origin? Shall we have an orderly phalanx of pottery, another of wood and a third of metal, or shall we permit these to form a stylistic trio? Or, eschewing both alternatives, shall we favor a third which insists upon a harmonizing of these elements in an interior actually old, or designed in terms of the old, to give to the objects displayed a local habitation and a name? Which of these methods is or can be made the most intelligible to the public as expressive of the artistic aspect of a culture, itself the legacy of a given race or nation and of a given time or style?

While these questions sought answer in the administration of older material, another influence was also at work, namely, the wave of interest in public education and that special phase of it fostered by Pestalozzi and others, from whom dates the importance given to "object lesson material" in teaching. Such material falls immediately into the museum collection class, and we find the idea of object teaching and the idea of the museum as a collection of demonstration material linked together in the new interpretation of public education. This received its greatest impetus in Germany and Switzerland, later in Scandinavian countries, and in its train followed the establishment of several important institutions.

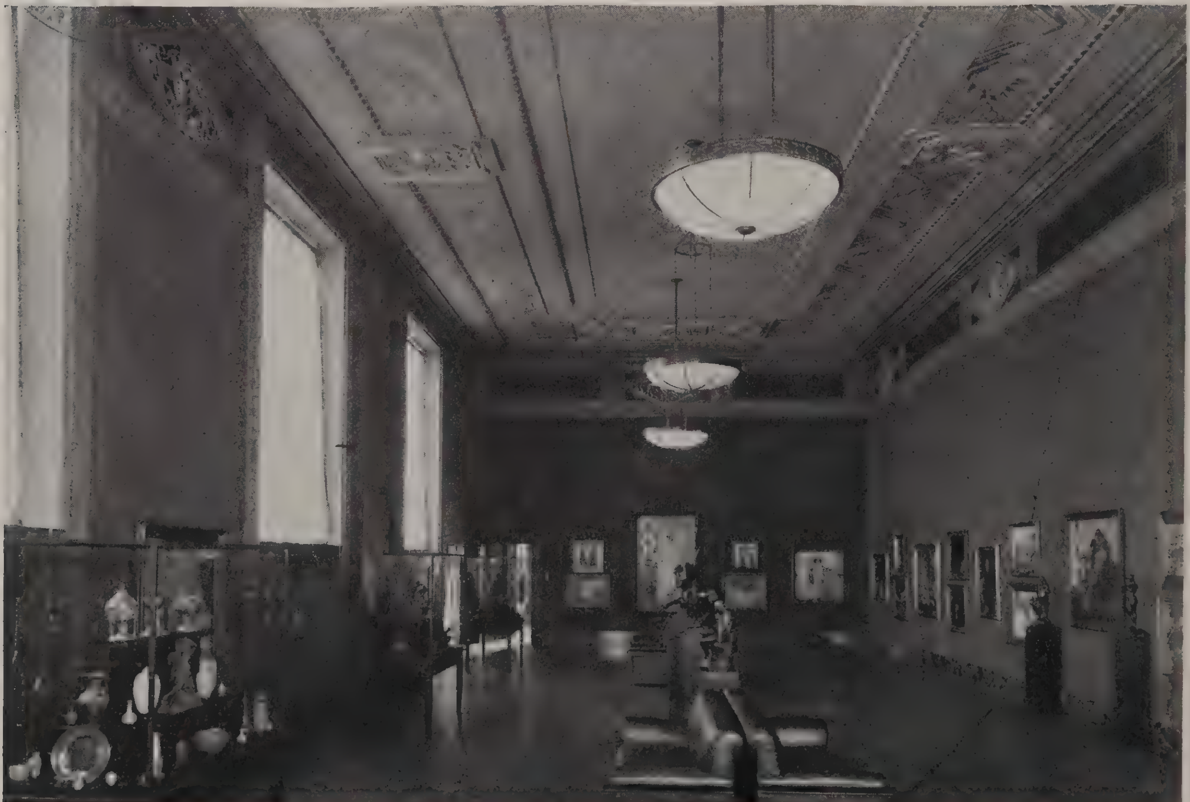
On the art side the new concept favored the type of display which showed all objects as nearly as possible in their cultural relationships, conceiving of design in all forms as the servant of civilization, not only as its record. Outstanding examples of the type are the Swiss National Museum at Zurich, and the Bavarian National Museum at Munich, the one with 62 and the other with 76 exhibition units, such units being rooms, courts, chapels or other unified displays, many of them including the actual wall and ceiling paneling, fireplaces and other architectural features, these constituting the dated background for a room arrangement with portable objects of like provenance. Other important buildings falling in the same class are those, in Germany, at Darmstadt, Lubeck, Magdeburg, and that at Nuremburg, founded in 1852, and housed in a suppressed Carthusian monastery since 1857; extensions erected 1866-1902. Other buildings of this class are at Copenhagen, Denmark; Stockholm, Sweden; Bygd, Norway.

In connection with these installations it should be borne in mind that any surplus of objects still can find place in other preferably adjacent galleries, where they may be grouped according to material or by any other one-line classification. Again, that when enough entire rooms are not available, or even in addition to these, period style groupings in alcoves as shown on three sides of a room, or else smaller concerted displays of culturally related objects may be arranged, these being sometimes relied upon more or less as footnotes to the historic rooms. There is the further practice, frequently resorted to in the collections mentioned, of designing a new environment; in other words, a new interior in accord with the old objects displayed within it. In such cases the designer may find it possible to use reproductions of mouldings and other items, or he may count upon his own skill as an interpreter of the historic style required, designing in that vein without measured duplication. In the Detroit Institute of Arts use of this last mentioned method is well illustrated and handled with consummate skill, and to that extent we may consider the new Detroit building a calculated demonstration of what has hitherto been generally known as the German method of period room or period style display. It should be remembered, however, that the method followed at Detroit has also been demonstrated elsewhere in this country. Period style groupings have long been used at the Metropolitan Museum of Art, for instance in certain of its galleries devoted to the decorative arts, while a number of actual rooms of various periods have also been installed. But the best example of the method is, of course, the American Wing, opened in 1924, which contains actual rooms, with furnishings, as well as period style displays in adjacent "feeder" galleries, in which the concerted arrangement of objects of various types is shown against a background whose effect is achieved with the aid of duplicates of historic architectural details.

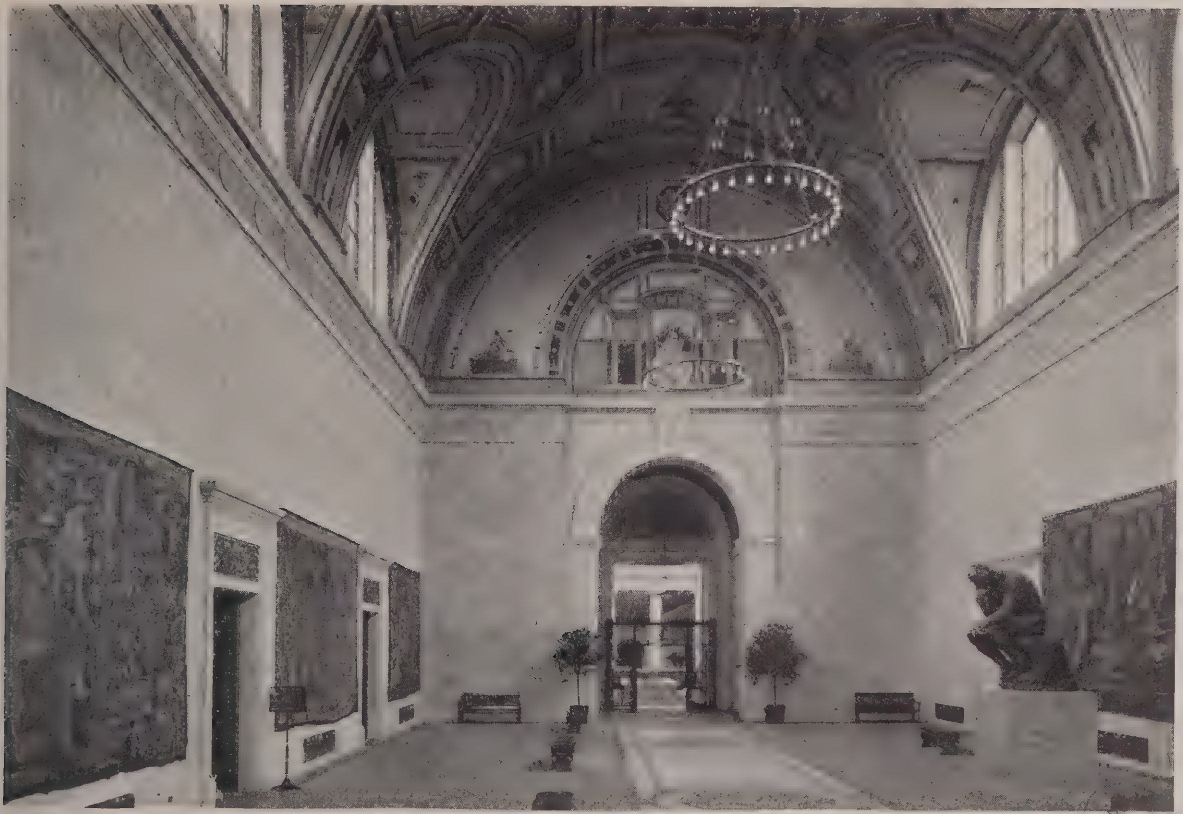
For inaugurating this type of display in terms of indigenous material in the United States the honor goes to the Essex Institute, in Salem, Mass., which installed a series of early American period rooms in 1907 and in the following year moved to its own grounds a seventeenth century house destined for demolition. An extension of this principle, though not intimately related to the present matter, is the actual preservation and rehabilitation of old houses, making museums of these so as to present therein the life picture of their day. This is the case in certain degree with regard to many "national monuments" abroad, such as various chateaux and palaces in France and elsewhere, where room arrangements are preserved. In this class belong also a number of buildings in this country maintained by societies, such as the Society for the Preservation of New England Antiquities, which controls some 12 old house-museums, all furnished; by city or state governments, as in the case of the New York City Hall or the Schuyler Mansion at Albany, or by other agencies. In 1904 the Rhode Island School of Design, at Providence, built a Georgian dwelling (Stone, Carpenter & Willson, architects) as a setting for the Pendleton Collection. While the Essex



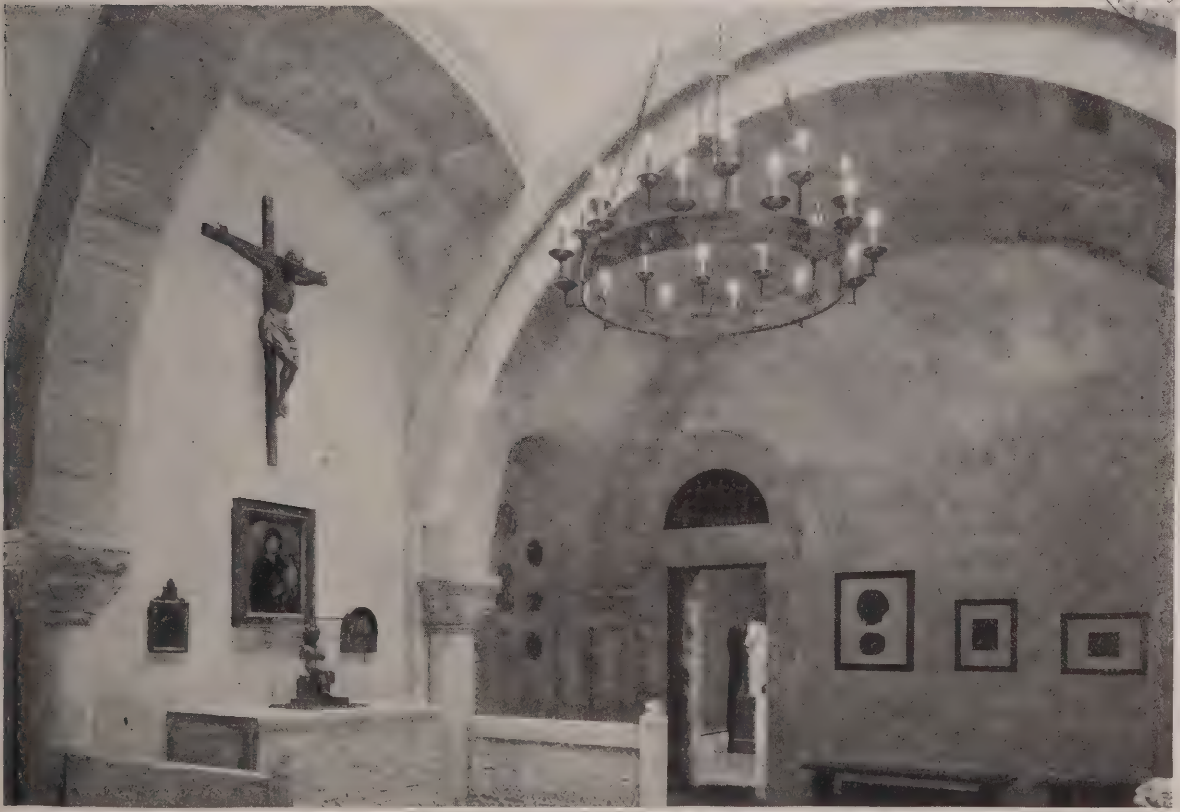
COURTYARD



GALLERY OF CONTEMPORARY AMERICAN ART



MAIN HALL



HALL OF EARLY CHRISTIAN ART

displays are actual, as is the case in the Metropolitan's American Wing rooms, the Providence setting definitely followed the type of display shown in many of the rooms at Munich and Zurich and now again shown so well at Detroit. The important consideration is, to be sure, that the architect of today has designed a new setting in an older vein and so has provided an appropriate harmonizing background or interior for a concerted display of objects disposed as nearly as possible in their life relationships. The task in the end is one primarily not only for the museum director or staff, but as thoroughly one for the closely collaborating architect, who truly designs and executes his building "from the inside out." So, if the point is raised: why all this preamble about museum installation?—is that the architect's function?—our answer is that it may be and often has been a large part of the architect's function and, in sober fact, in the Detroit Institute of Arts it *is*. What is more, in a museum of art, most of the interior is installation in some form; so what better can the designer of such buildings do than study the museum man's point of view, which must regard the galleries as but portions of a picture, to be completed by displays to be made there?

The Building: Exterior, General Plan and Larger Interiors. The Institute of Arts at Detroit is noteworthy, however, for more than its method of exhibit installation. There are the item of its exterior design, the item of its functional plan, and the item of its general effectiveness as an opportunity for those pleasurable reactions which are the soul and substance of art anyhow. The building itself is highly successful as a civic monument. It is of Vermont marble and was erected at a cost of something over four millions, the sum defrayed out of general taxation. How many cities can boast of similar enterprise? This may account, in part, for the fact that the new building savors a little of splendor. It is of the city, for the city, by the city, and by this token Detroit seems, at least, to throw the gauntlet to other communities of like or even greater size. The consummation of 20 years' endeavor, the perpetuation of a project launched 41 years ago under the name of the Detroit Museum of Art and now under its present ægis set up in a public building as a department of the city's work, Detroit finds this result of its striving a satisfying and impressive edifice, notably in its relation to the Public Library (Cass Gilbert, architect), completed in 1921, which faces it across a wide avenue and with which the new Institute constitutes a distinctive "point" in the city's plan, a center of arts and letters.

The building is assuredly inviting, though without humility; it beckons but does not appeal. It gives at once the impression of a most carefully studied exterior which has been permitted to evolve slowly out of proposed use and other practical conditions, to meet which a plan and interior had first to be wisely conceived and acutely adjusted. In brief, it is what might be termed a functionally expressive design—and what else can good design in architecture be? The effect is that of a one-story structure simply treated and on a scale best described by the hackneyed word "grand," which has in its architectural use a real meaning. In fact, the true merit of this scale will not be fully appreciated until landscaping, adjacent building or other features have been developed to afford workable comparisons. A nearby apartment hotel seems mincing and overcrowded with detail, with its necessarily numerous windows. Broad values of mass and planes have told their story becomingly. Barring the Ionic entrance order, ornament has been sharply limited to rare accents in key blocks, corners of string courses and the like, while the great spread of the building—it has a frontage of over 300 feet—is enhanced by the parallel horizontals of a fine rustication, and the openings further accented by iron gates, balconies and grilles in reserved treatment.

The style would be described as Italian Renaissance modified, which means revised, modernized, applied to new ends. A Beaux Arts strain is apparent, suggesting the training of the designer, yet the resultant effect is developed by thoughtful handling, as that of an American building of 1927. The stylistic merit of the whole lies in this interaction of strains and offers another proof of the gradual and highly intelligent modification of the traditional motif, wherein lies any true advantage that may be credited to a conservative attitude toward past "periods." So here, without loss of regard for the formulary of the Italian Renaissance, which contributes to the design what may be called an artistic stability, we have the definite indication of present activity, immediate public utility, strength of purpose, all of which are characteristic of the sanest modernism.

The plan is disposed according to a basic scheme of classification of art for museum purposes, as visualized by the director. This accounts for an American section, an European section and an Asiatic section, each of which is provided for in a block or mass of the building. The major axis from the entrance is that of a main hall or concourse, continues through one of these principal blocks, namely, the Asiatic, and is stopped against a theater set at right angles to it; while the American and European blocks flank the hall.

The European galleries occupy all four sides of a rectangle and following around to the right from the entrance hall and as a chronological sequence circumscribe a courtyard, the ground of which is the basement level of the building. The courtyard itself is an outdoor exhibition space. Its brick walls and openings are treated exteriorly to suggest the period style rooms shown within, while at the same time offering adequate background for various well curbs, columns and other objects of stone and metal exhibited there. So we have a Gothic wall with pointed arches and buttresses to aid the effect of an antique chapel, projecting from it; also a Renaissance wall with Italian stone-framed openings, and door giving upon a stairway to the court level; and on another side there are a Flemish type rectangular oriel and a series of circular brick openings. The brick cornice also varies. Diverse elements, never so on their own soil but usually at odds when recreated out of new material, have been most skillfully blended. One notes at once the practice established in similar courtyards at Munich, Darmstadt, Zurich and elsewhere, a fact which does not in the least dim the real achievement of director and architect in the present case.

In the left flanking block, assigned to American art, the courtyard is replaced by a group of three galleries devoted to temporary exhibitions, while in the block at the rear, containing chiefly Asiatic art (though there is an overflow of European and Near Eastern material), the galleries are disposed about a Baroque garden.

This is entered from the main hall through an exceptionally good iron gate by Caldwell, an old possession of the museum, while at its far end there is a loggia with a fine stairway, its halfway landing allowing height for a passage to the theater beyond. The stairway, with rail by Yellin, who has done numerous other metal items which may be construed as decorative elements of the architect's design, admits to smaller galleries, the only rooms above the main floor. These are to be devoted to modernist art, which has been segregated as though for a period of acclimation or perhaps,—according to Darwinian precepts,—to give sway to the law of natural selection!

In the garden the ornament of masks, inverted consoles, rockwork, pilaster caps, grilles and finely scaled mouldings is overborne by a fountain of exuberant proportions, which takes up much of the floor area. Its size is no doubt accounted for in part by the conception of the garden as a sort of *atrium,* in which the fountain figures as the pool or *impluvium;* its lines do seem to carry upward quite reasonably to the rectangular opening formed by projecting ends of concrete beams moulded and colored to simulate ancient wood; the rectangular ceiling opening itself is filled in by a tent cloth in mustard color with blue border, suspended from rods at the short ends of the rectangle and masking most of the skylight. Despite the presence of several ceramic items, not in the architect's conception, and which do not help the color of the scheme, the garden is not at the moment primarily an exhibition space. An interesting note is the fact that the wall above the beam ceiling level and supporting the skylight has been painted a light blue; in other words, treated to please the spectator. It is not fair of course to compare the Baroque garden on any terms with the courtyard, which was conceived at the outset as an open air gallery and beside which it is bound to seem showy. As part of the main axis vista, however, it falls logically into place and is pleasing.

The main hall is glorious with color, its vault and penetrations decorated in a manner possibly best described as "Pompeian to Adam," for there is much of the latter's sobriety and calm despite the still very fresh color and the strongly Pompeian sophistication of the ornament. This great central space has yet to gain the tone that only age can contribute, when surface brilliance has gone from the color, which now draws the eye too suddenly upward, and when walls and pavement have mellowed. The architecture will then serve as a unifying background for the tapestries, large sculpture and other sizable pieces to be shown here. The general proportions of this interior are superb and of imposing dignity, yet not lacking the least in friendliness. The room fulfills its chief function; while impressing the visitor with its grandeur and quality, it still draws him on.

Another highly effective feature is the unit composed of vestibule and entrance hall. Three great arches constitute the former, carrying through the entrance motif. At right and left are a check room and an information and sales desk. The entrance hall is groined; two short barrel vaults at its ends are supported by a fine Ionic order.

In the arrangement of floor levels in the building this entrance hall is an intermediate landing. There is a flight of steps at the entrance, and from the entrance hall other flights lead left and right to gallery circuits and straight ahead to the main hall, while other stairways give upon corridors on the basement floor.

The Galleries. The main floor galleries present a stimulating variety and vista. Architect and staff have collaborated to produce a chronologic sequence of historic pictures. Endless study of detail is evident on all sides, so that one finds real pleasure in the completeness of each stylistic illustration. Rooms are conceived not only as entities correct in all their parts and relationships as to period, but also as individual problems in interior design. There is color galore, all in key, all in style, and, with negligible exceptions, all thoroughly satisfying. Nor is this the only scheme of variegation. Different styles mean different floors; high, low,

Entrance Lobby

Loggia of the Rear Garden

vaulted or beamed ceilings; mouldings of changing profile; door frames to accord; wall coverings in varied hue and texture;—throughout there is the appearance of the utmost freedom and flexibility which contributes, for the visitor, the fascination of uncertainty as he goes from room to room. Two wood floors in adjacent rooms, for instance, will be laid in different pattern; two ceilings in rooms of one style will be designed one as a groined, the other as a barrel vault. Even ventilator grilles and visitors' benches change shape and color to fit room styles. The significance of all this is emphasized by the fact that the objects shown are of many kinds and materials, but have been grouped in their one-time life relationships and given solidarity by the architect's stylistic interpretation of the room setting.

Excepting the three temporary exhibition galleries and one or two spaces at angles in the plan, all these rooms are sidelighted, a departure that will merit close observation. The window opening becomes a constant of light measurement, and feasible room sizes are thus determined. Yet, despite this definite control, rooms of nearly identical sizes give the effect of having quite different proportions; others are worked out as multiples of the basic unit, which is about 24 by 28 feet. The circulatory system of galleries, the course of art flowing through rooms arranged in series, is eminently sensible and instructive, the building itself becoming a textbook in period design. The itinerary, begun at the right of the entrance hall, carries one first around the open court, next to the rear around the garden, then forward again to pass around the American circuit; things of most recent production, and especially loans, being sought in the galleries of temporary exhibitions. Here classic Greek motifs in a wide frieze establish a quiet background that even the Da-daist of a minute ago could hardly object to, in view of the possibilities of contrast with it, while in the gallery of twentieth century American art the ceiling borders and other features have been concocted out of the prevailing feeling and elements of current American decorative art.

Of special interest here also are one or two specific items of installation. There is shown a two-story early American house, the whole facade of which (a copy) has been included. The upper floor of this is reached by its own original stairway. The house is a unit, and its one door is both entrance and exit. The visitor is thus placed definitely in the environment to which the house belongs. Before it, as though on a street, he may pass the house and go on to other galleries. A somewhat similar scheme is followed in a French eighteenth century room. Being too small to fill the gallery, it was set away from the window, which would have given too strong a light. The space between the room and the outer wall is treated as a trellised enclosure suggesting a garden; this, illuminated from the large window,

Corner of the Gothic Hall

Detail of the Garden

is seen through the smaller opening of the old room and gains the effect of outdoor brilliance. These are but indications of the degree of skill and the thoughtful care which have everywhere inspired the work of both staff and architect. The lesson of German and Swiss period style method has been assimilated, improved upon, and entirely adjusted to current American need.

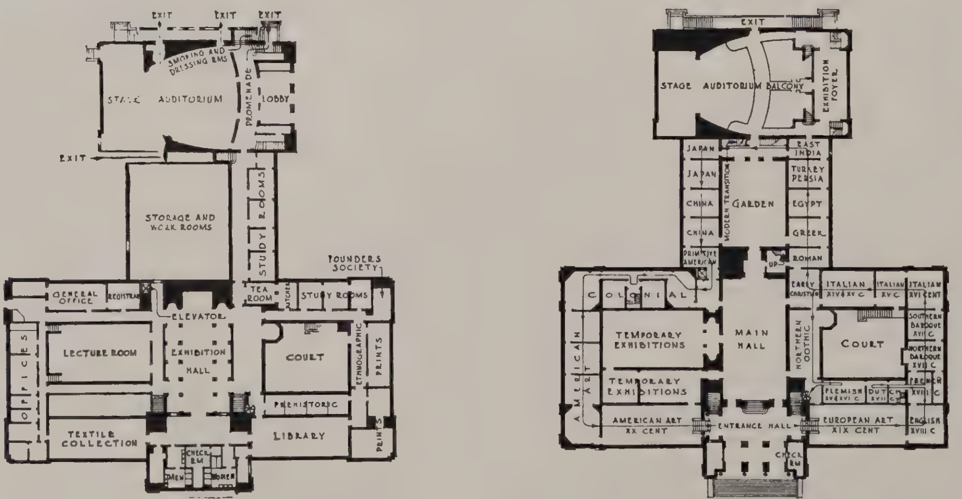
Lower Floor, Utilities, Theater. But the functional aspect of the modern museum plan is tested not only by galleries but also, and perhaps more severely, by the administrative and "housekeeping" arrangements. The disposition of these facilities on the ground floor of the Detroit building is illuminating as indicating a type plan first given definite form in the Cleveland Museum of Art, erected 1915-16 (Hubbell & Benes, architects). There are here a special business entrance and a shipping entrance. The former gives upon two corridors at right angles; at the point of meeting is an information and control desk, with telephone switchboard. On one corridor a row of offices includes in planned sequence the director's office, trustees' meeting room, and quarters for several curators. On the other, again in studied sequence, appear the secretary's office, general clerical office and the registrar's office. These two series complete two sides of the plan under the left main mass of the building, the third side being devoted to a textile file, exhibition and study room. The central space directly beneath the temporary exhibition rooms is given to a lecture hall, with a seating capacity of 500 and with booth and equipment for stereopticon and motion picture projection. The decorative scheme here is slightly modernist, pleasingly so. There are two entrances to this hall, giving upon a corridor from which wide doors lead to a large circulation area and exhibition space at the center of the building, just under the main hall, windows toward the opposite side opening upon the outward court. Two additional exits are provided flanking the stage. The lecture hall is completely encircled by corridors, the party walls at the sides of the room being pierced by a row of heavily curtained French windows. Checking-, smoking- and rest-rooms, with toilets, are readily accessible, placed just under the entrance hall.

Around the courtyard we account for the library, convenient to the stairway, and also for print study and storerooms and for print exhibition space. There are here, on two sides of the court, two long galleries devoted to exhibition material classed as prehistoric and as ethnographic, neither of which could logically find a place in the main floor sequences. On the third side is a series of study rooms for European art, especially necessary in a museum arrangement of this sort where all material of a kind on hand cannot be shown, because the principal concern in the main galleries is the complete period style disposition. These study rooms will be the haven of persons specially interested in specific types of material, such as, for instance, metalwork. A similar series, for Asiatic art, runs directly beneath the galleries devoted to this field. Just at the angle of the building provision is made for a public tea room and kitchen. Under the Baroque garden there is a large space for dark storage, and elsewhere on lower levels additional rooms are available for box storage, and space is allowed for a staff lunch room and kitchen. In various parts of the attic level a number of lofts offer further space for object storage, as well as accommodations for a photographic studio. Deliveries pass the offices of secretary and registrar and are made under control of the superintendent, whose office is adjacent to that of the registrar. A raised loading platform gives access to a spacious receiving room, where objects are unpacked and inspected and from which an adequate freight elevator carries them to all levels of the building.

Under the ground floor level various utilitarian purposes are met,—a plenum chamber is under the lecture hall, and under the main storage room is equipment for vacuum cleaner, current control, ventilating and air washing and humidifying apparatus, the latter again for the lecture hall. Heat and current are obtained from outside sources. Ventilating and humidifying equipment for the galleries is placed in an attic loft. Artificial lighting throughout is of total-direct type, in some cases as on pictures supplemented by individual reflectors. Wherever glass ceilings are required these are contrived as removable units and effective spots of interest obtained by cut and matched sections in pleasing patterns. At the rear of the building, facing on another street, a well equipped theater completes the plan. This is calculated to meet a community need, not only for dramatic performances but also for concerts and important meetings. It contains a large organ. The interior is quiet, tasteful and impressive; the exterior profits by a seemliness which brings it into pleasing continuity with the museum structure itself. On the balcony level is an exhibition foyer.

The merits of the Detroit Institute are many; the promise of its usefulness is large. It has certain great advantages:—a really functional plan; a well conceived and well maintained display method; a fine building, historic yet modern; a reasonableness and simplicity of arrangement; an appropriateness of interior design; a well studied regard for the practical utilities of administration and technical services. Some may well say that the scheme of gallery installations suggests that of the Munich Museum or that the general character or "feeling" of the whole interior suggests the Darmstadt Museum. In the final analysis we say with conviction that this building and its collections as they now stand have made a distinct contribution to museum theory and practice in the United States; have in truth made fact out of much that could hitherto be classed only as experiment.

Pope, in the "Essay on Man," writes: "Charms strike the sight, but merit wins the soul." There are charms here, many of them, and they register well, but the basic merit of the Detroit Institute and of the idea it represents is real and inspiring.



Basement

First Floor

Plans: The Detroit Institute of Arts

Paul Philippe Cret and Zantzinger, Borie & Medary, Architects

MODERN ARCHITECTURE IN HOLLAND

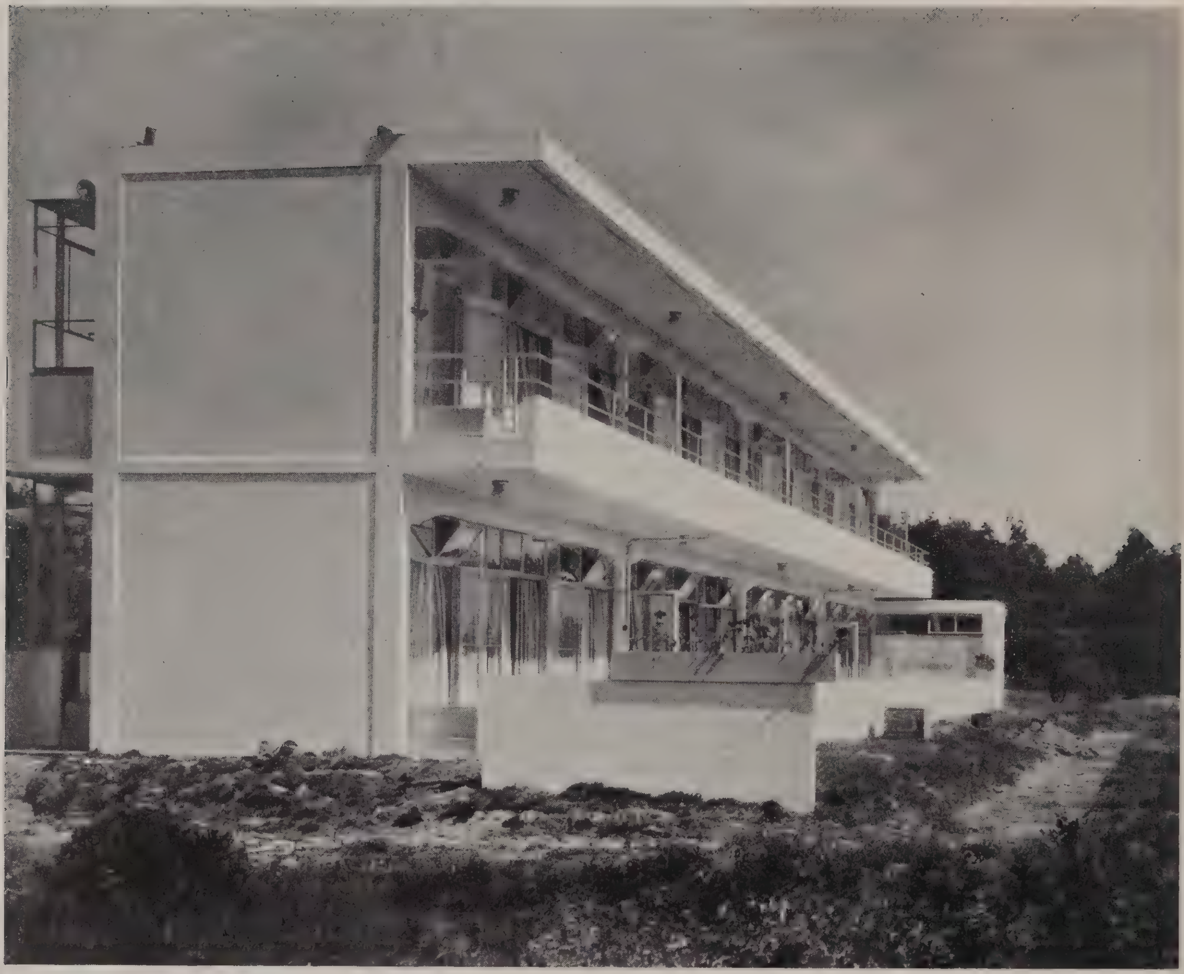
TEXT BY
EDWIN A. HORNER
PHOTOGRAPHS BY
SIGURD FISCHER

TO the average American who pictures Holland as a land of windmills, wooden shoes and Delft pottery, it will no doubt be a revelation to learn that in her principal cities during recent years there has been a volume of building activity sufficient to open the eyes of the most ambitious real estate operators on Long Island. Her prosperity, a result of her having rich colonial possessions and on account of her neutral attitude during the World War, is evident at every turn, and her architects are contributing much toward the development of a logical modern architecture.

In attempting to present a comprehensive impression of the best of the modern architecture in Holland, Sigurd Fischer and I soon found ourselves confronted with a task which was out of all proportion to the amount of time at our disposal. Arriving in Rotterdam on July 24, 1928, it had been our intention to set out at once for Amsterdam, and after spending a week in that city to proceed by motor into Germany and the Scandinavian countries. However, difficulties which arose over failure of automobile insurance papers to arrive necessitated a delay of several days, which though at first disconcerting enabled us to become fully familiar with the building situation in Holland and prevented our doing it the injustice of neglecting it. Even then, we learned of several excellent examples of architecture which it was impossible for us even to see.

There is today much talk about a new, a modern architecture which will be a true expression of both function and construction. In the beginning all buildings, whether for shelter or worship, were purely utilitarian structures. As man developed, his temples and tombs became more refined in proportions and were embellished with ornament, culminating in the perfection of the Greek orders. These were a true expression of the logical use of the materials at hand to solve the problems of shelter and protection with the utmost possible beauty. Today our lives are more complex, and our requirements more numerous, with a corresponding increase in the number, nature and uses of materials at our disposal. Nevertheless, the same principle still applies to an even greater extent, that architecture in most cases is primarily functional and secondly æsthetic; a structure must first economically serve the purpose for which it is intended, and in so doing be a pleasure to the eye. In Holland at present there exists a group of architects who, in creating new designs, hold uppermost in mind two qualities,—namely, logic and simplicity. The extremists of this group go so far as to contend that nothing that is not absolutely essential to the function of a building should be included in its design; that there should be no ornament whatsoever. This idea is consistent with the theory behind the modernist movement that, in order to produce a new architecture which will be appropriate to our time, we must begin with the barest necessities and evolve a new style. Fortunately, however, the Dutch architects have thus far been prudent in acting upon this theory, for, unlike the modernist, they take into account the fact that architectural styles are not the product of a lifetime or of a generation, and that to discard all knowledge derived from precedent is sheer folly. In addition to applying logic and simplicity in the individual unit, the Dutch architects, and likewise the German, are giving a great deal of attention to city planning. Mr. Van Esteren, of The Hague, who is among the leaders in the modern movement and who has recently been awarded the commission to revise the plan of Unter den Linden, in Berlin, points out the importance which is being given to the effect of the group or ensemble, both in form and color. Interviews with several of the prominent Dutch architects produced a unanimity of opinion regarding the lack of uniformity in the architecture of New York and showed a preference for the rows of high-stoop brown-stone houses with their backyard courts and the plain shafts of some of our tall buildings because of their simple truthfulness. A strong criticism was expressed on the superimposing of "European castles" and classic temples on the tops of otherwise good skyscrapers, and in a number of cases the Medical Center, in New York, by James Gamble Rogers, was commended as an example of the possible pleasing aspect that could be attained throughout a great city by the proper handling of plain masses, giving them solidity and dignity.

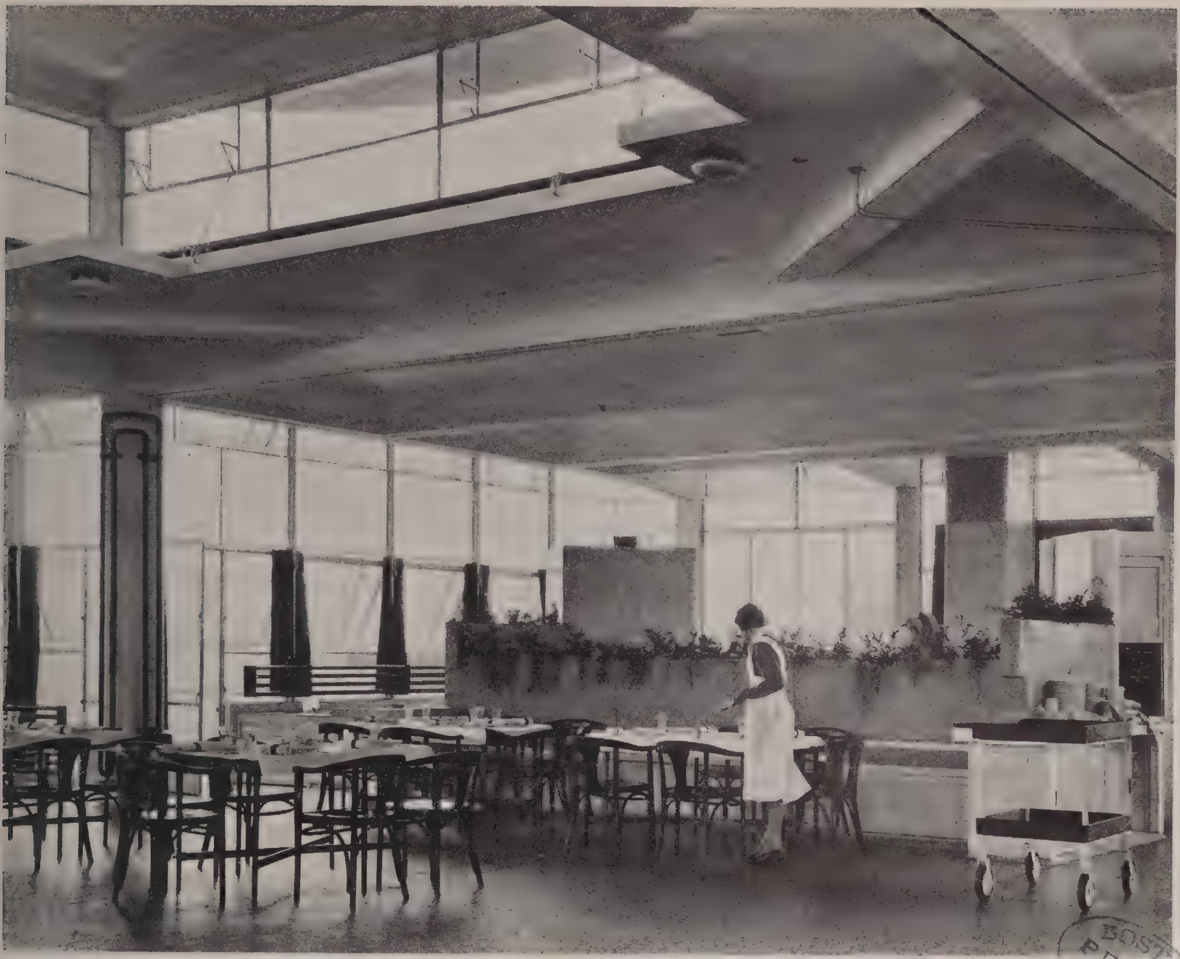
The most conspicuous phase of this city planning trend in Holland is in a number of coöperative groups of attached and semi-attached residences in such cities as Amsterdam, Haarlem, The Hague and Scheveningen. These are, as a rule, municipally owned and leased to individual tenants for nominal rentals. A very charming example of this type of city planning is the group of coöperative dwellings in Haarlem, by Mr. van Loghem. These are designed for the middle-class tenant and comprise a group of 52 houses or attached units, planned about a central court, the whole scheme occupying a fair-sized city block. On the more important street the plan breaks



Pavilion No. 2, "Zonnestraal," Hilversum
Duiker & Bijvoet, Architects

back to form an open court, which lends dignity to the principal approach to the group. In the center of the court facade access is to be had to the inner court through an arched gateway over which hangs a most delightful little balcony. The architecture throughout is the essence of simplicity,—plain mouldings, excellent proportions and an effective use of color being the outstanding features. Not the least of the charm of the whole composition is in the roofs of gray tile, a material that is very much favored for this purpose in Holland. Another example of a similar group is the block of workmen's dwellings in Scheveningen by Mr. Zwart, of The Hague. Here a school is made the center of interest in the plan, and the group is arranged about two courts, one of which serves as a back yard for utilitarian purposes. In the ground stories of some of the units there are shops and stores. A rather unusual and unique residential block has been done by S. de Klerck, in Amsterdam, consisting of an entire city block of tenement dwellings. The colors of mellow red brick and roofing tile and the deep and unusual shadows cast by irregular projections are quite interesting, but one is inclined to wonder at the logic behind the tall pyramidal turret, and the cigar-shaped bay window hanging on the corner!

The first building to attract our attention as being a product of the modern trend in Holland was the Catholic parochial school for boys in Rotterdam. The architect, P. G. Buskens, of Rotterdam, by the skillful use of masses and the discreet placing of a few colorful ornaments in terra cotta, has produced a building that is most pleasing in effect. Just the right amount of interest is added to the design by the simple means of employing projecting brickwork at corners and in window panels. At Hilversum, W. M. Dudok has done a number of very good schools, illustrations of which may be shown in these pages. Here again we find the interest of the design contributed largely by the effective use of mass and color, with the simplest of ornament used sparingly. Mr. Dudok frequently protects the entrances to his schools



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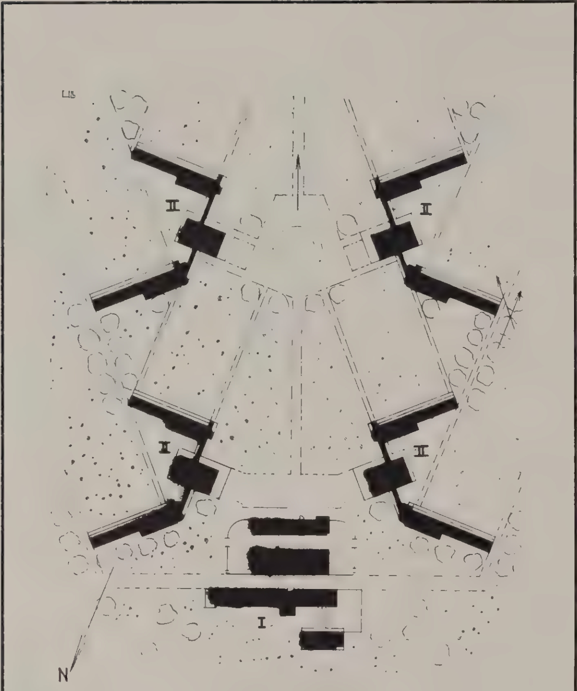
Dining Room, Central Building No. 1, "Zonnestraal," Hilversum
Duiker & Bijvoet, Architects

with a concrete slab porch roof, supported on two sides, with the opposite corners projecting as a cantilever. Although in one or two instances the result is not unpleasant, one somehow feels that the detail is used chiefly for effect, and that at least ostensible support under the corner would ease the mind of the average layman who approaches the entrance. In the corridors of his schools Mr. Dudok has used wainscoting of buff brick with base courses and caps of the same brick dipped in hot tar. End joints of all courses are butt joints with no mortar showing, the bricks being beveled back from the exposed corners to permit actual mortar joints. The cap course of black or tar-dipped brick projects about 1 inch beyond the face of the wainscoting to take the plaster above, which is applied on common brick laid up flush with the face of the wainscoting. The floors are of white tile about 10 inches square with black borders on the classroom sides and with each classroom door emphasized by a break in this border strip. The *Badhuis* or public bathhouse, at Hilversum, is also by Mr. Dudok and is designed in much the same manner as are his schools. Here he has employed well proportioned masses, a clever arrangement of ventilating louvers, and a few spots of brilliant color to produce an excellent building of great simplicity.

Reference has here in several instances been made to the use of color as an important part of modern Dutch architecture. Too much emphasis cannot be put upon this, for it is the skillful use of strong color combinations that lends a unique charm to everything in Holland. The Dutch have been past masters of its use, as shown in the bright colors and immaculate condition in which they paint and keep their river and canal craft. They now have brought this medium into use in their architecture as an inexpensive means of enhancing the beauty of flat surfaces, to the consequent elimination of unnecessary ornament and mouldings. Combinations of such colors as yellow, gray and orange; green, gray and black; blue, with touches of red and yellow; black with



PLOT LAYOUT

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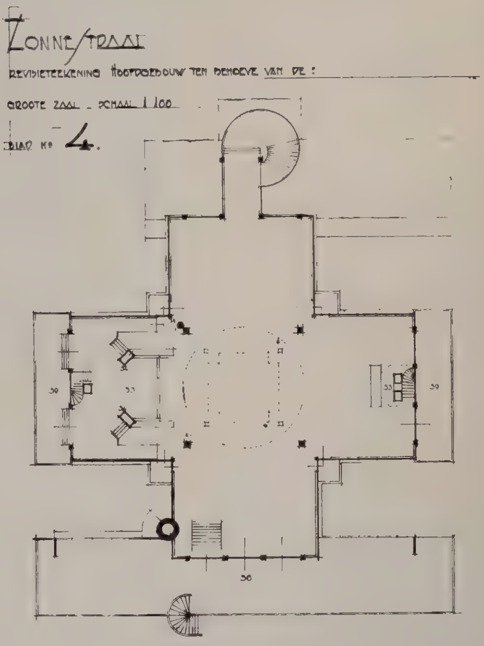
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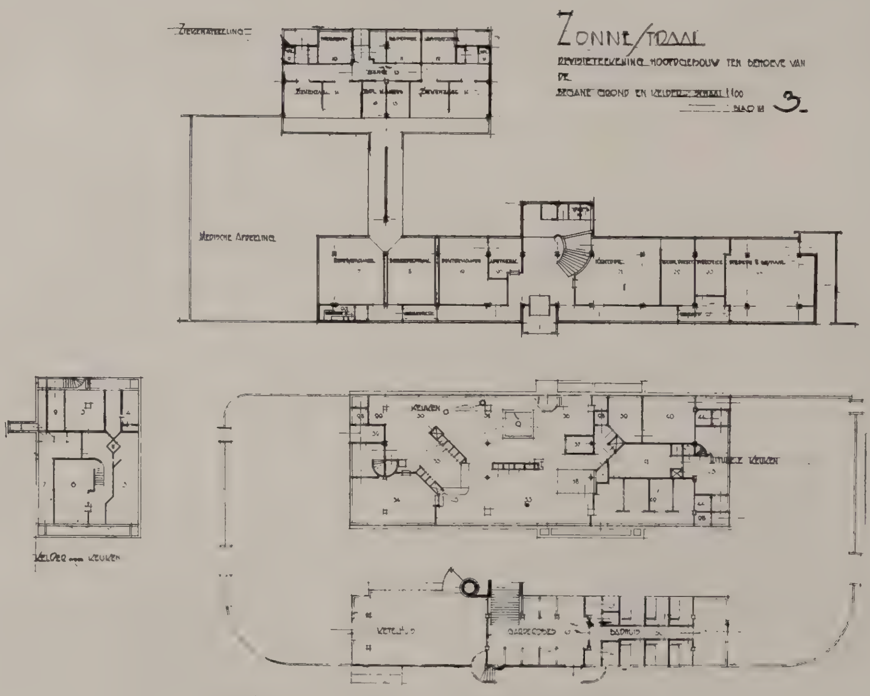
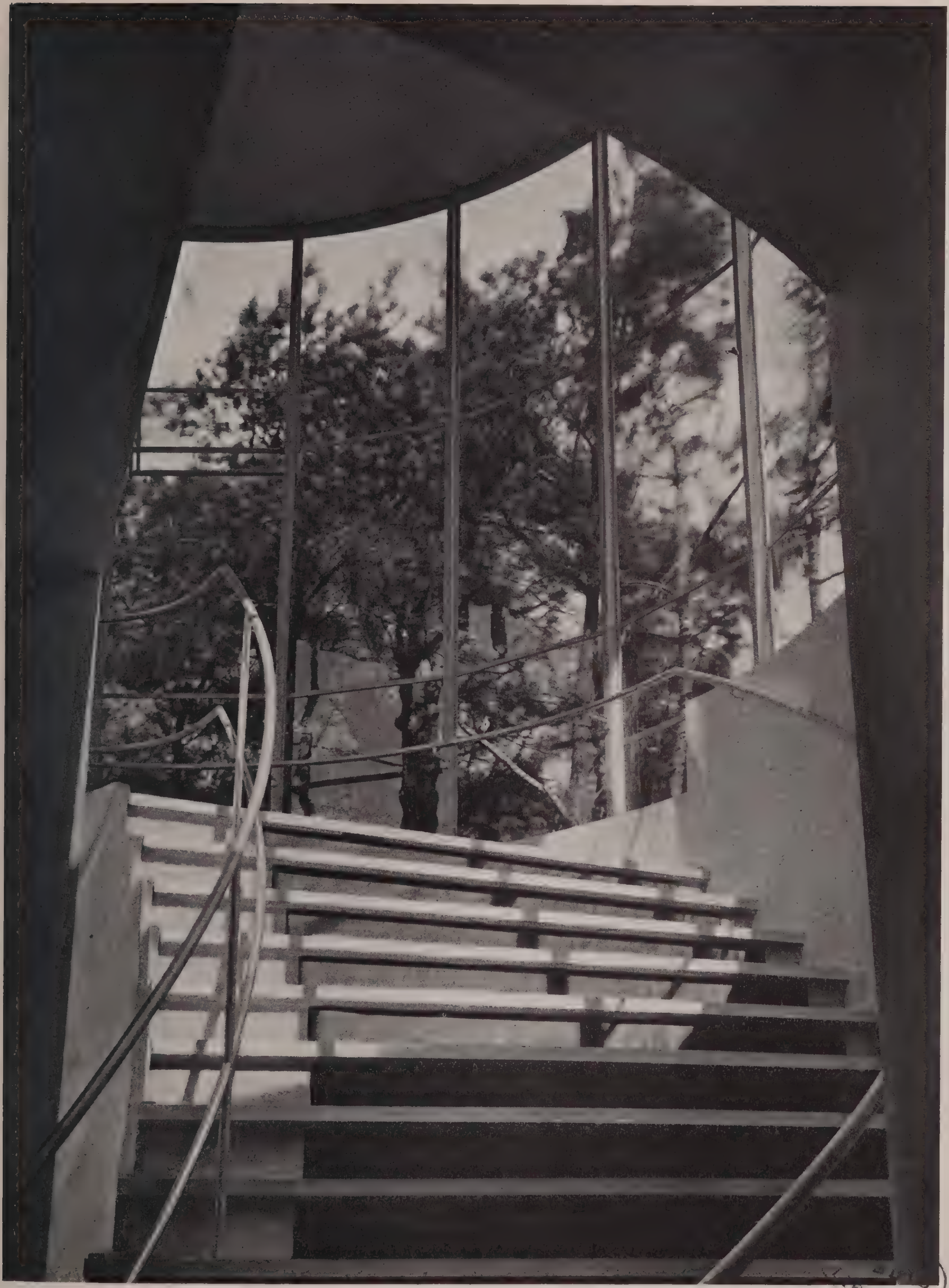


GROUND FLOOR OF CENTRAL BUILDING

PLANS: "ZONNESTRAAL," HILVERSUM

DUIKER & BIJVOET, ARCHITECTS



LIBRARY

STAIRCASE, CENTRAL BUILDING NO. 1, "ZONNESTRAAL," HILVERSUM
DUIKER & BIJVOET, ARCHITECTS

touches of one or two contrasting colors, are very pleasing on plain slab doors and on wood trim, both exterior and interior. The Central Post and Telegraph Building in Rotterdam, although completed in 1923, may be included in our discussion of modern architecture. The building is constructed in two units; the great hall, which is of reinforced concrete throughout, was designed by J. Huisman and is structurally independent of the main office building by which it is surrounded. The main building is by Mr. Bremer, now city architect of The Hague. The chief architectural interest in this building is the manner in which the structural concrete has been treated to produce an excellent vaulted interior. Dark glazed terra cotta in interesting geometrical designs has been effectively used in the lower portions of the walls. Another building for much the same purpose, but designed in an entirely different spirit, is the new Post and Telegraph Building at Haarlem, designed by J. Crouwel, of Amsterdam. This is, in my opinion, one of the very best examples in Holland of the skillful use of mere materials of construction, such as brick and metal sash, to form an interesting and pleasing composition, with only a few bits of well executed sculptural ornament. There is a simple dignity about the building which is in keeping with the function which it serves. Diagonally across from the Post and Telegraph Building in Haarlem is the *Nationale Bankvereeniging,* by H. F. Mertens, architect and engineer. Though not essentially modern in the strictest sense of the word, this structure illustrates the possibilities in the use of brick offset by well designed sculptured ornament. The interiors in plain plaster with green glazed terra cotta wainscots are exceedingly simple, but in good taste for a small banking office. In Haarlem there is also a small church of quite unusual design, the *Kapel Nieuw Vredenhof,* by H. Korringa. In plan, the auditorium is essentially an isosceles triangle with the rostrum at the apex and the base angles cut away, a shape which presents an interesting problem in roofing. The solution is successful, lending a unique charm to this little chapel in its wooded surroundings. Here again we have simplicity, logic and a careful selection of the quality of color and texture of materials playing the chief roles in the creation of a good building. Another church of similar interest from the standpoint of irregularity of masses is the First Church of Christ, Scientist, at The Hague. The architect, H. P. Berlage, has used green prism glass, laid up in mortar with the brickwork as a means of lighting the auditorium. In the building for the *Rudolf Steiner Klinik,* at The Hague, another phase of the modern trend is illustrated. In his effort to make the building fit into the landscape on a site which in irregular plan and contour forms a promontory in relation to its surroundings, the architect, Jan. W. E. Buijs, has accomplished quite an extraordinary result. This idea of fitting architecture into the landscape is no doubt inspired by the work of Frank Lloyd Wright, who is held in great esteem in Holland.

Outside of Hilversum, hidden away in timberland, is one of the very best of the modern buildings of Holland. *Zonnestraal,* the tubercular sanitorium designed by Duiker & Bijvoet, of Amsterdam, may at first glance convey to the conservative mind an impression of extreme modernism. Consideration of the nature of the problem, however, convinces one of the absolute logic behind every detail of this excellent group of buildings. An institution for the treatment of a disease requiring for its treatment fresh air, sunshine and cleanliness, has been done in immaculate white with a maximum area of glass in movable units. The plan is so arranged that all wards and private rooms command a clear vista over wooded land, at the same time permitting the sunlight to reach all patients' rooms to a maximum degree in winter, when it is most needed. Also at Hilversum, Mr. Dudok has built two very good residences,—his own and another very similar in design on an adjoining lot. These houses, which would fall in the $50,000 class in the United States, were built at a cost of 25,000 guilders, or $10,000. This is partly accounted for by the fact that a skilled laborer in Holland receives a wage of five guilders a day, or about $2.

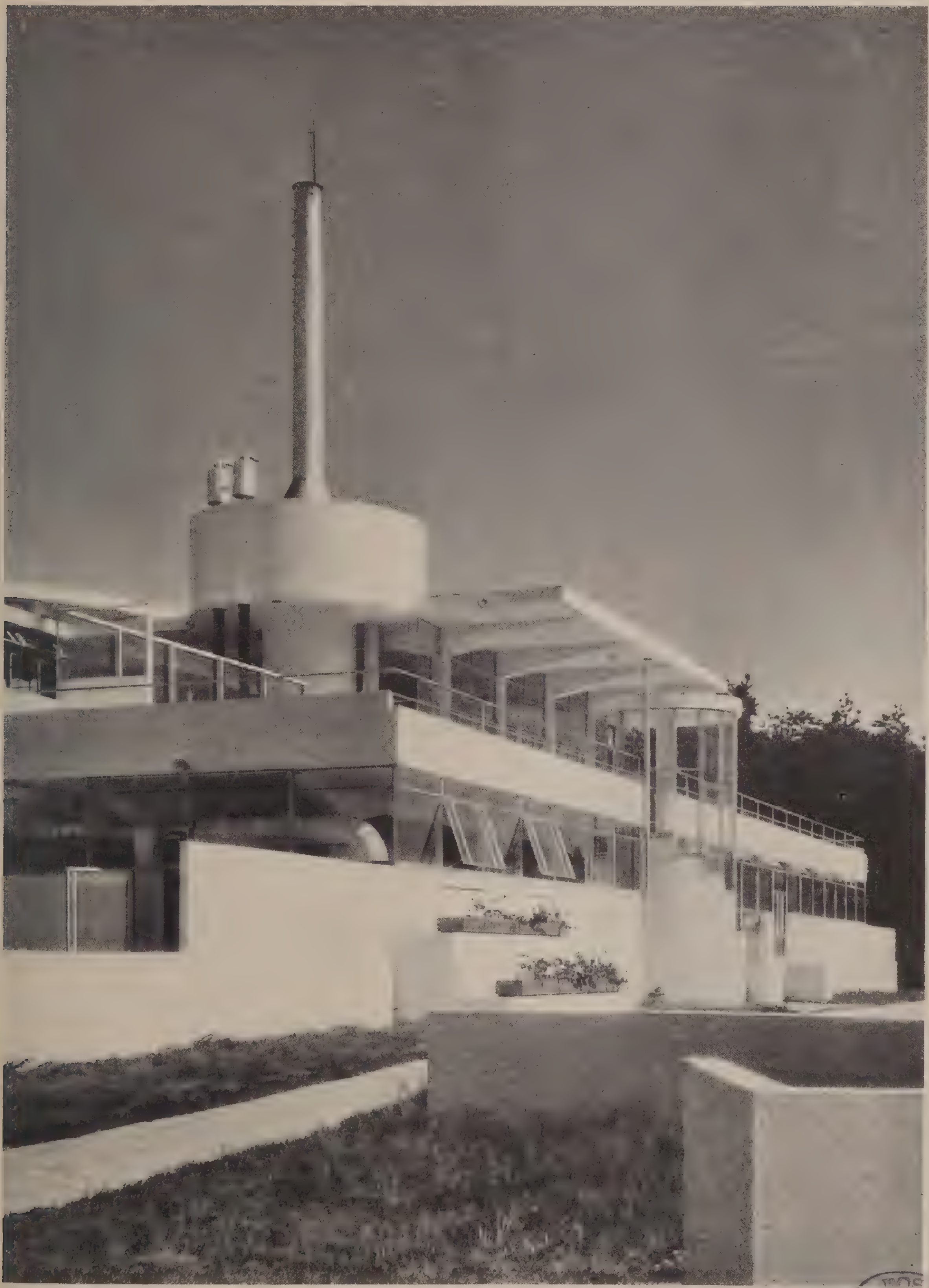
In the art of planning, the architects of Europe may well afford to study American methods, for their plans are often quite naïve in the inefficient and impractical arrangement of space and fixtures. But in the art of creative design we in America will do well to heed the work of our contemporaries on the continent, for they are achieving a truly new architecture. This development is especially true of Holland, Germany and France; and while we may hesitate to accept as art many of the results of their efforts, our urban population will appreciate their attempt to cope with the battle between ideas and materials. In his sketch of a plan for Paris, Le Corbusier says: "The new event is the machine, which has reconstructed modern society from the ground up. However, we have not yet measured its significance. A revolution opposed to all previous centuries! No revolutionary spirit reigns, but we stand in the presence of revolutionary relations. We will formulate no revolutionary solutions, but will adjust ourselves to a revolutionary state of affairs. If this adjustment does not soon take place, the growing sickness now threatening us will injure, even if it does not shatter social life."

Twentieth Century European Architecture

FIVE years ago the late editor of THE ARCHITECTURAL FORUM, Albert J. MacDonald, together with Paul J. Weber of Boston, one of the leading architectural photographers in this country, spent four months in Europe securing a collection of unusual photographs of the best architecture of the past, many of which have been published from time to time as THE FORUM Studies of European Precedent. Five years have brought a great change in the architecture of this country as well as of Europe. A new expression in design, characteristic of the civilization of this age, is slowly but surely asserting itself,—an expression largely freed from the influence of the architecture of the past, and possessing a greater freedom, simplicity, logic and fitness than any architectural style in over a century. This new architecture should not be termed "modern," as it is modern only in the sense that it is the work of the present age. It is more truly the architecture of this twentieth century, evolved and produced by the requirements, the custom and the taste of the civilization of today, an age of great commercial, scientific and mechanical development, an age of high mental pressure and great physical strain, an age of tremendous wealth and unlimited possibilities. It is inevitable that this new era should demand and produce in all the arts an expression, individual, original and thoroughly characteristic. In Germany and Austria this breaking away from precedent first became evident, later gaining impetus in Holland, Sweden and Finland, and finally it has been embraced by all the spirited younger architects and designers of France, where work is being done so radical in character as to challenge the understanding and criticism of the more conservative members of the profession throughout the world.

Realizing the tremendous influences rapidly changing the character of all the arts, and the great interest being taken by American architects in the new architectural expression, the editor of THE ARCHITECTURAL FORUM last summer commissioned Sigurd Fischer, one of the foremost architectural photographers and critics in this country, to visit Europe and make a series of photographic studies of the best and most interesting examples of the new architecture of Holland, Denmark, Germany and Sweden. It is now our pleasure to present as the first of this series of illustrations of twentieth century European architecture, a group of recent buildings in Holland, in which the new architectural expression is brought out in a definite and consistent manner. During the present year, in each of the regular issues of THE ARCHITECTURAL FORUM, this series of remarkable studies of recent European architecture will be continued.

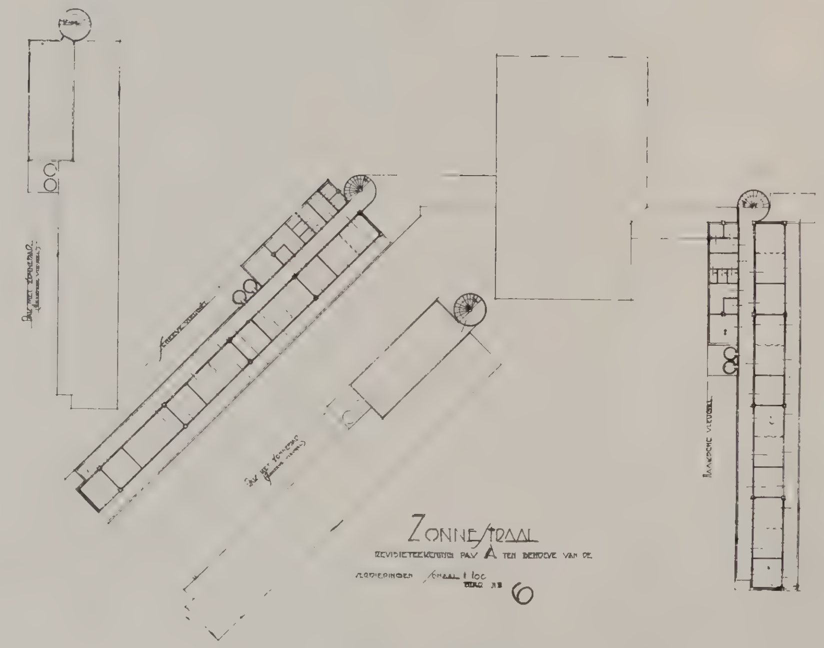
PARKER MORSE HOOPER



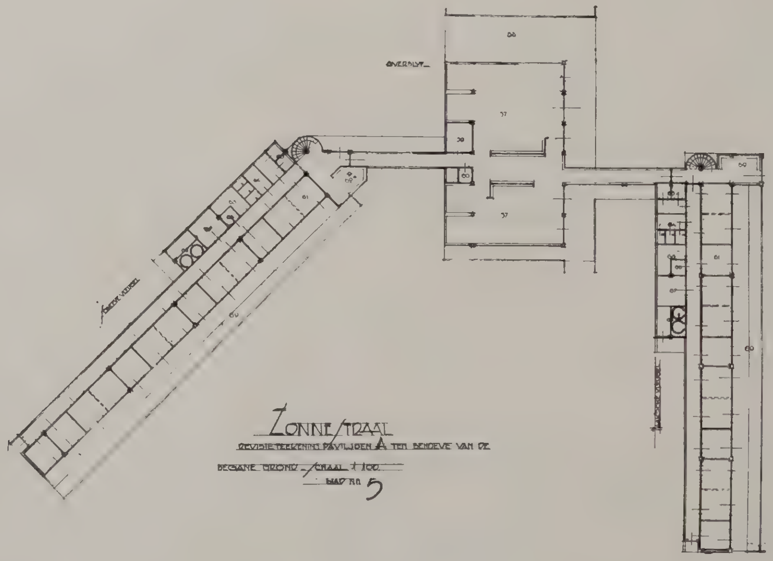
Photos. Sigurd Fischer *Plans on Back*

SOUTH FACADE OF CENTRAL BUILDING No. 1, "ZONNESTRAAL, HILVERSUM

DUIKER & BIJVOET, ARCHITECTS


ZONNESTRAAL
REVISIETEEKENING PAV A TEN BEHOEVE VAN DE
VERDIEPINGEN SCHAAL 1:100
BLAD No 6

SECOND FLOOR


ZONNESTRAAL
REVISIETEEKENING PAVILJOEN A TEN BEHOEVE VAN DE
BEGANE GROND SCHAAL 1:100
BLAD No 5

FIRST FLOOR

PLANS OF PAVILION: "ZONNESTRAAL," HILVERSUM
DUIKER & BIJVOET, ARCHITECTS

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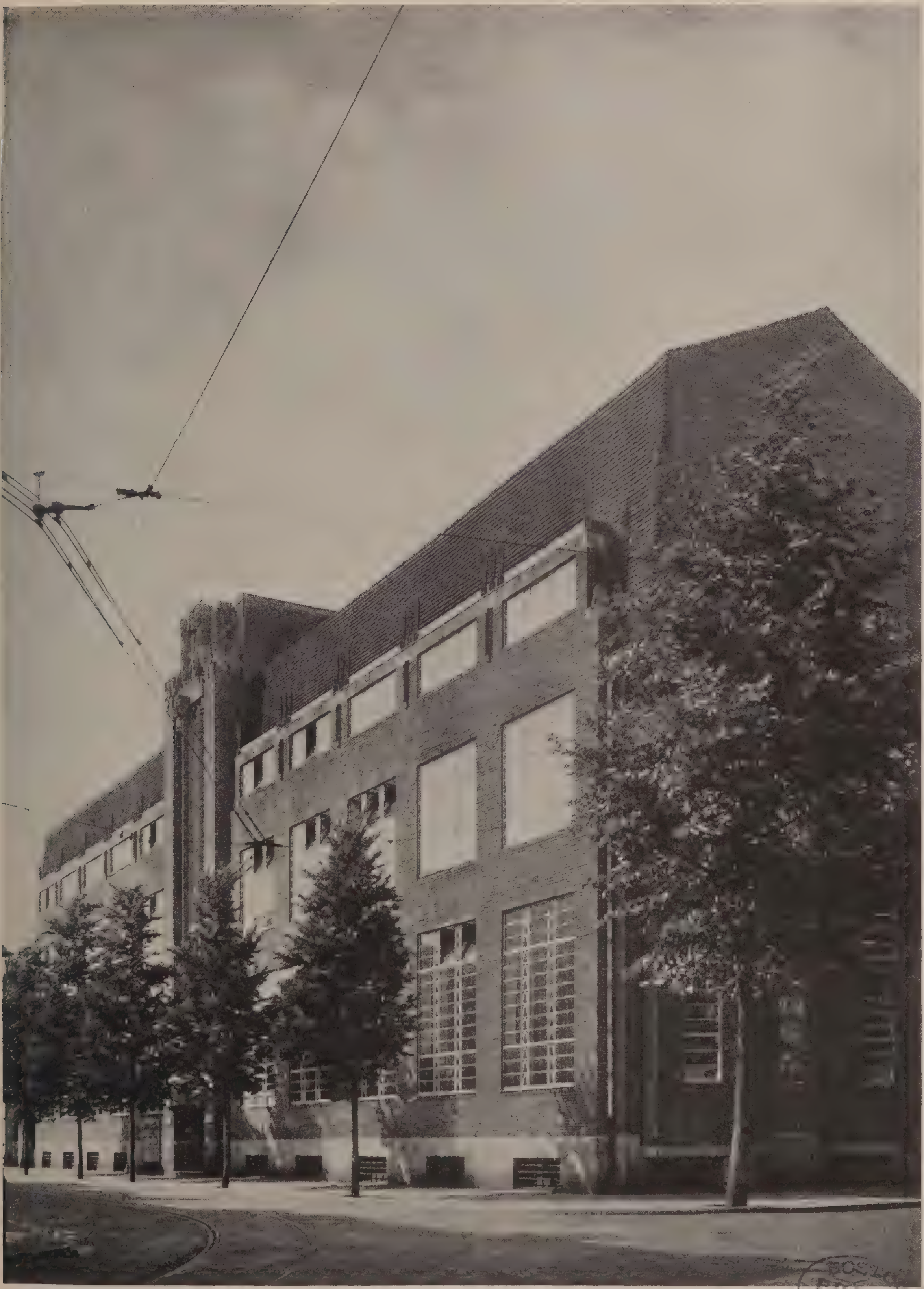

POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT

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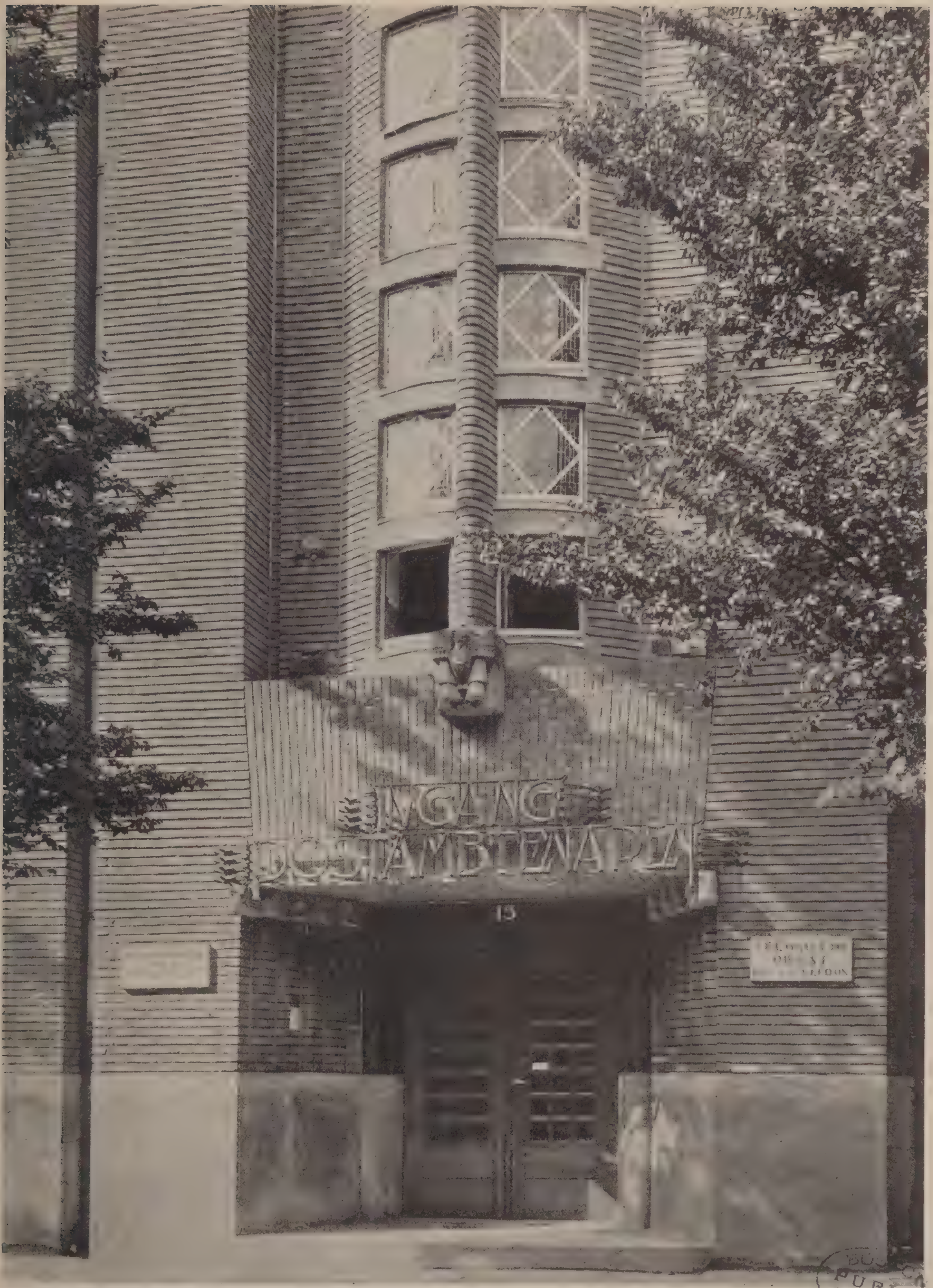

ENTRANCE TO POST OFFICE, POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT

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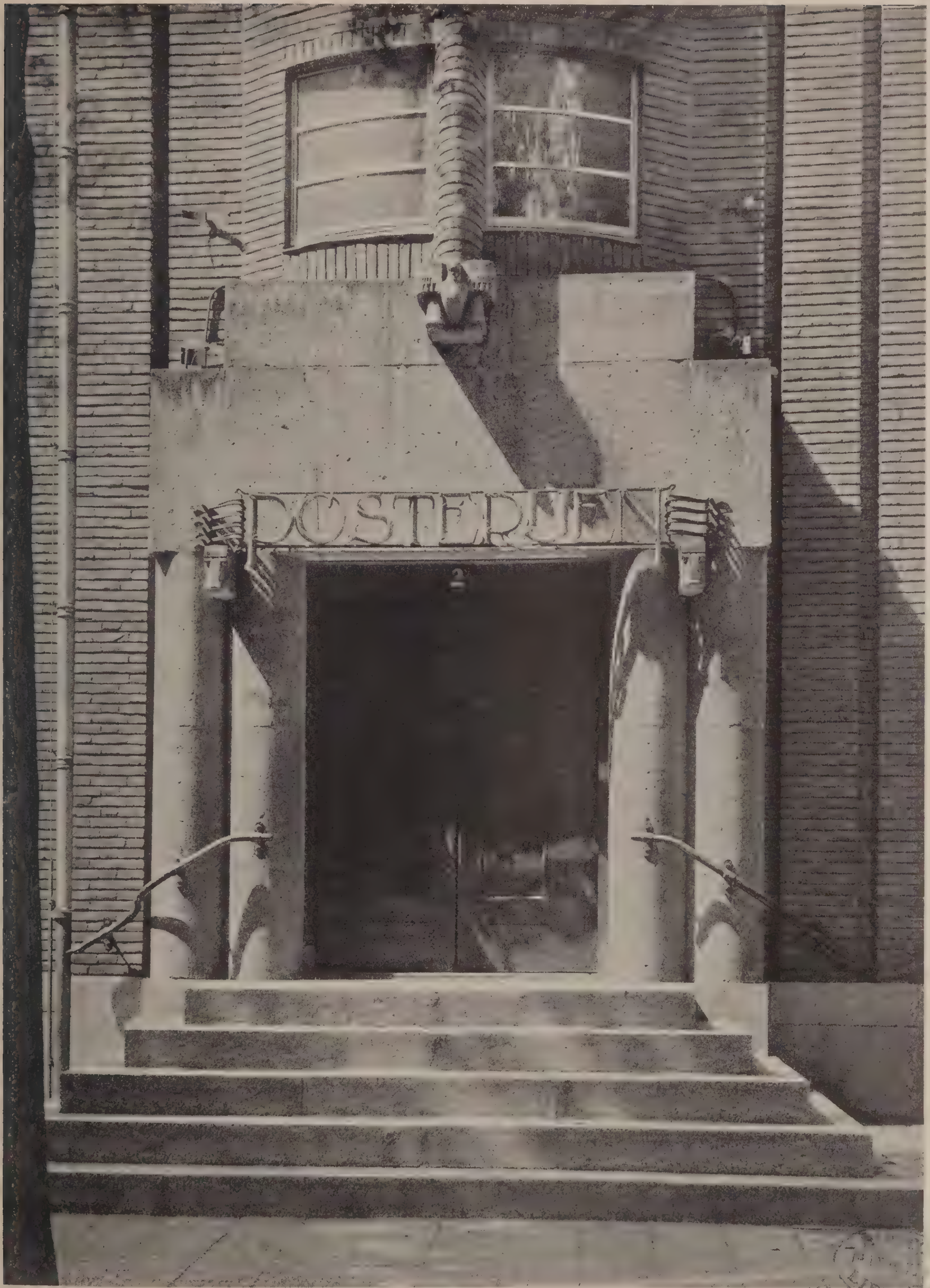
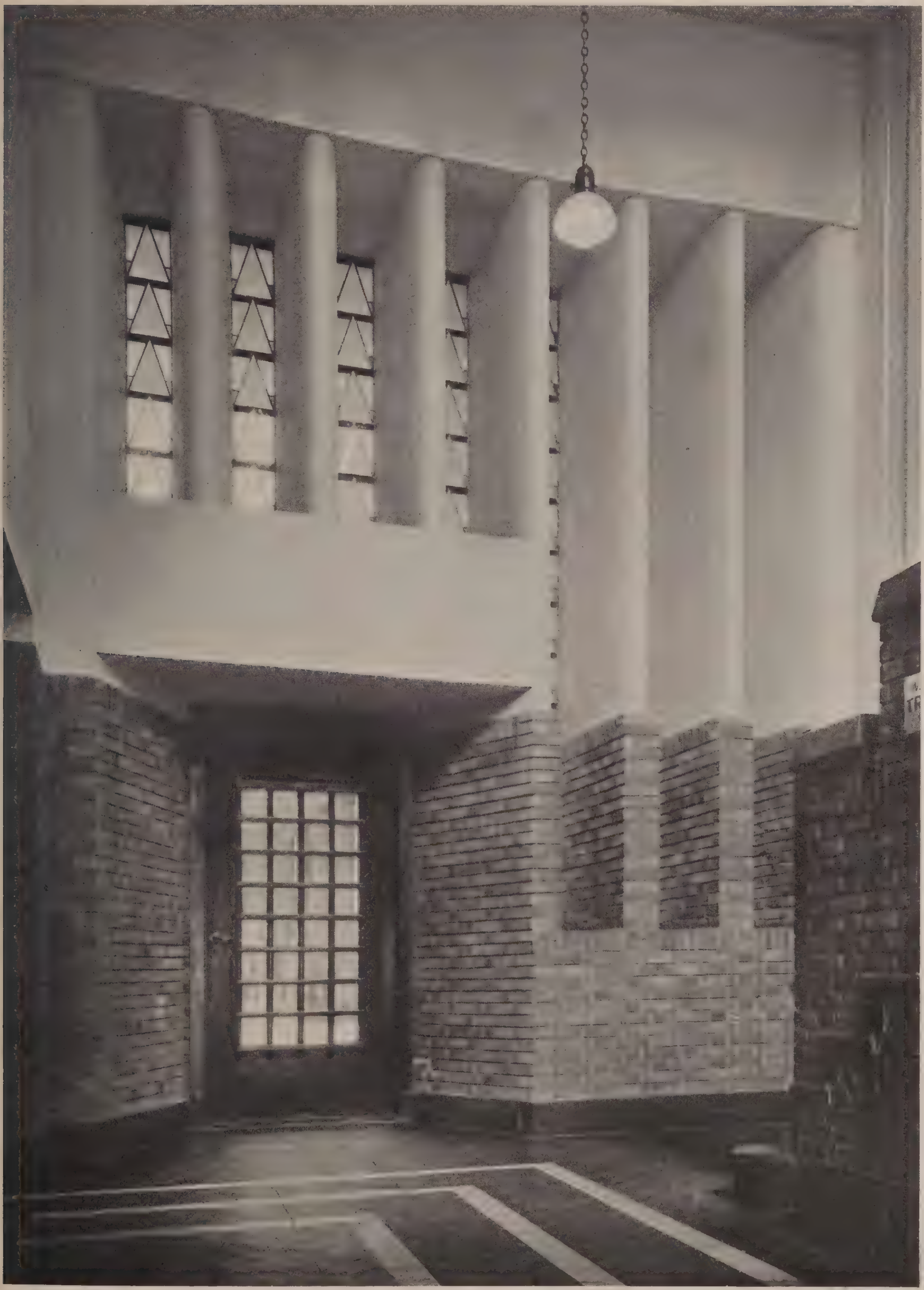
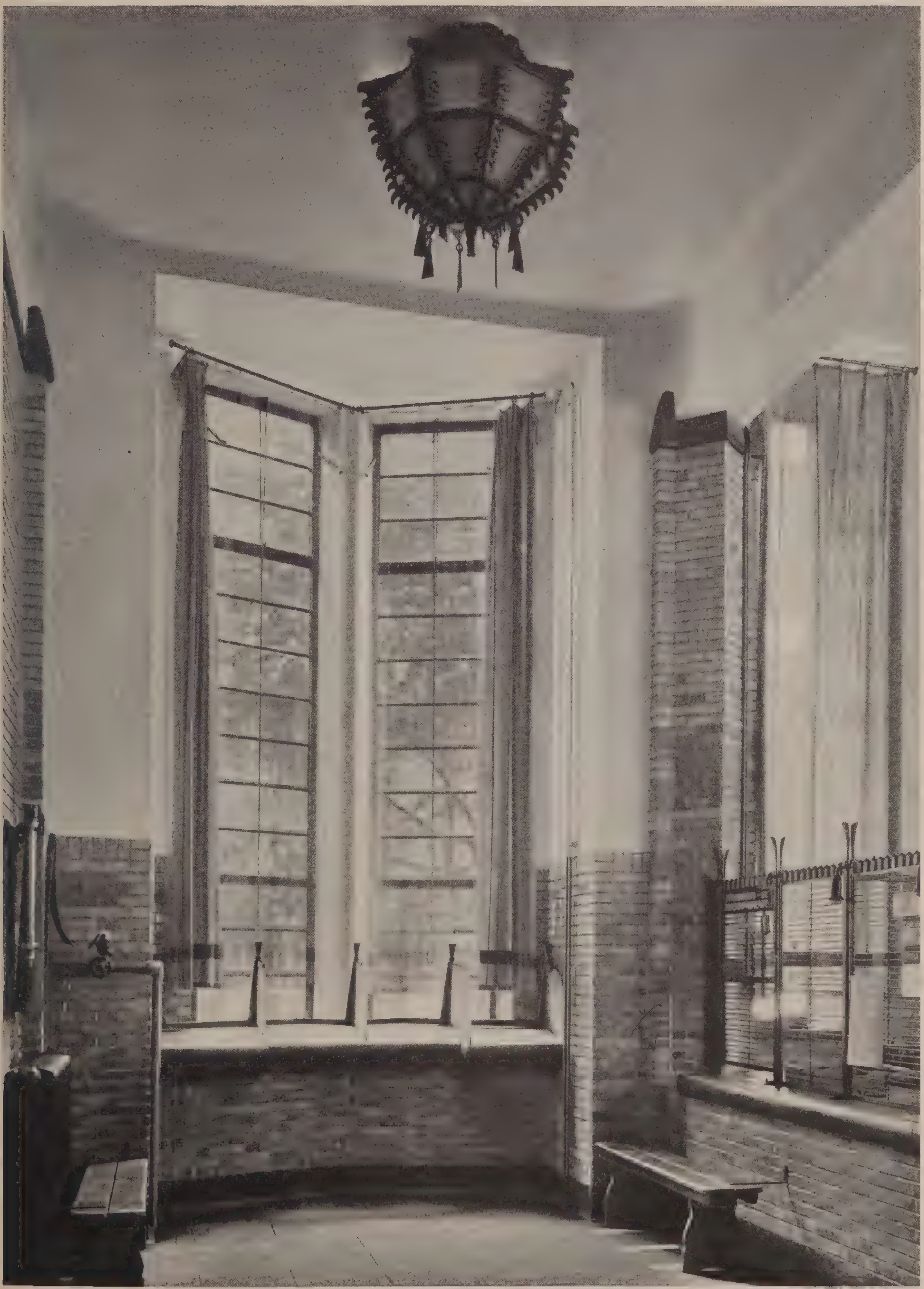


ENTRANCE TO EXECUTIVE OFFICES, POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT



STAIR HALL, POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT



BAY WINDOW, POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT

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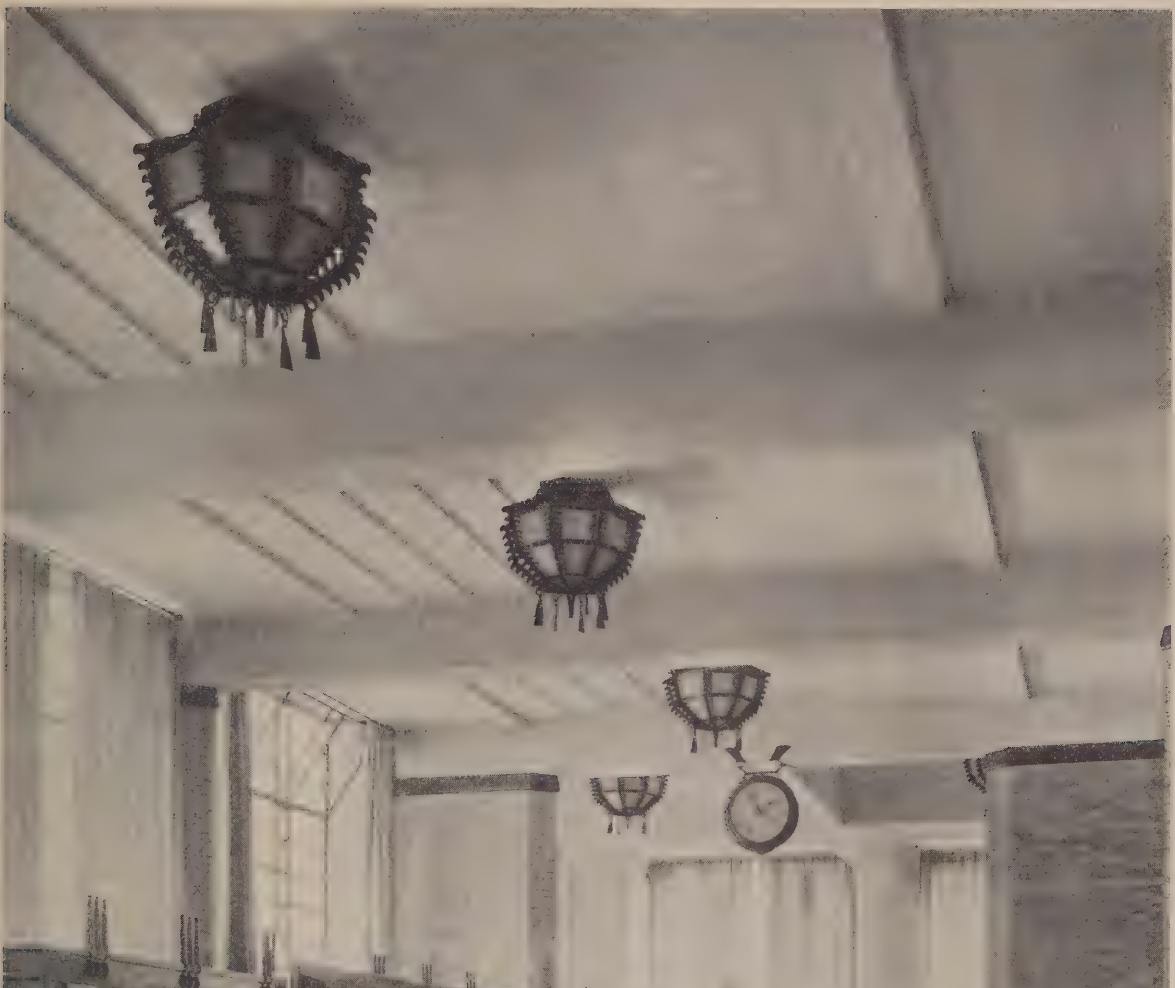

INTERIOR OF POST OFFICE, POST AND TELEGRAPH BUILDING, HAARLEM
J. CROUWEL, ARCHITECT

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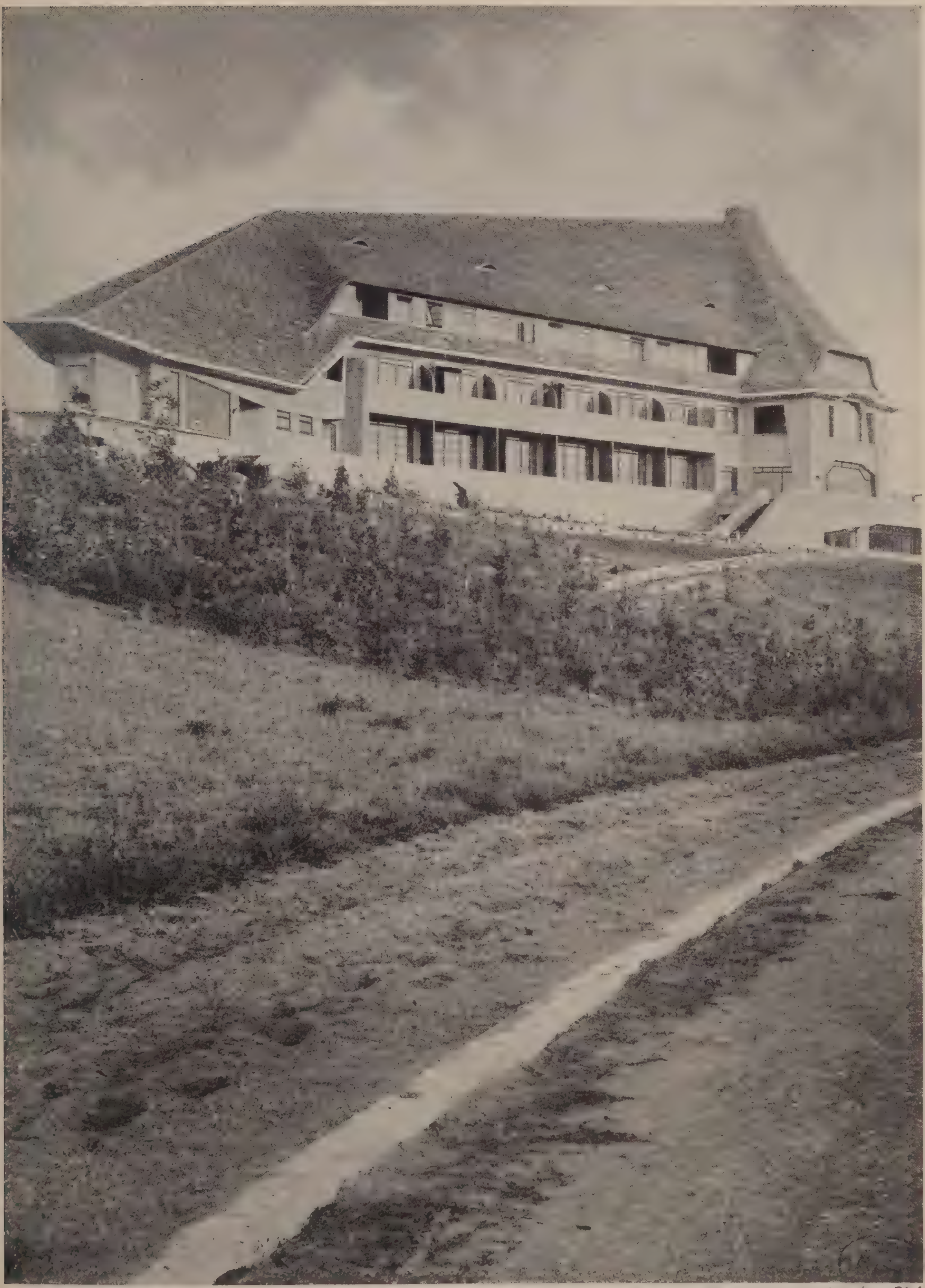
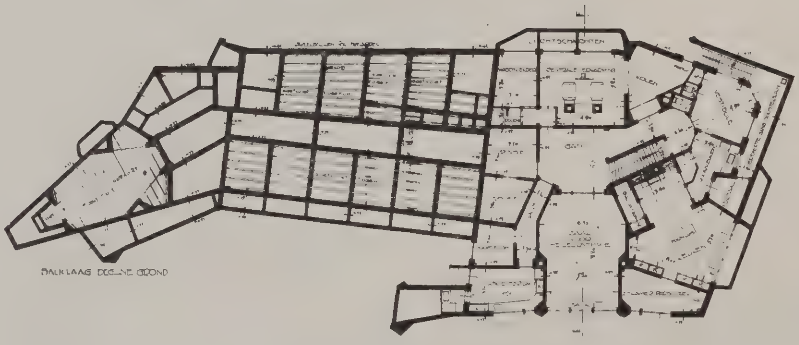


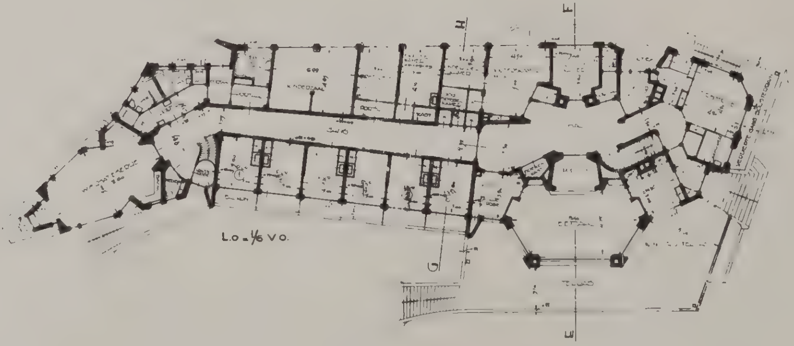
Plans on Back

RUDOLF STEINER CLINIC FOR NERVOUS AND MENTAL DISEASES, THE HAGUE

JAN W. E. BUIJS, ARCHITECT

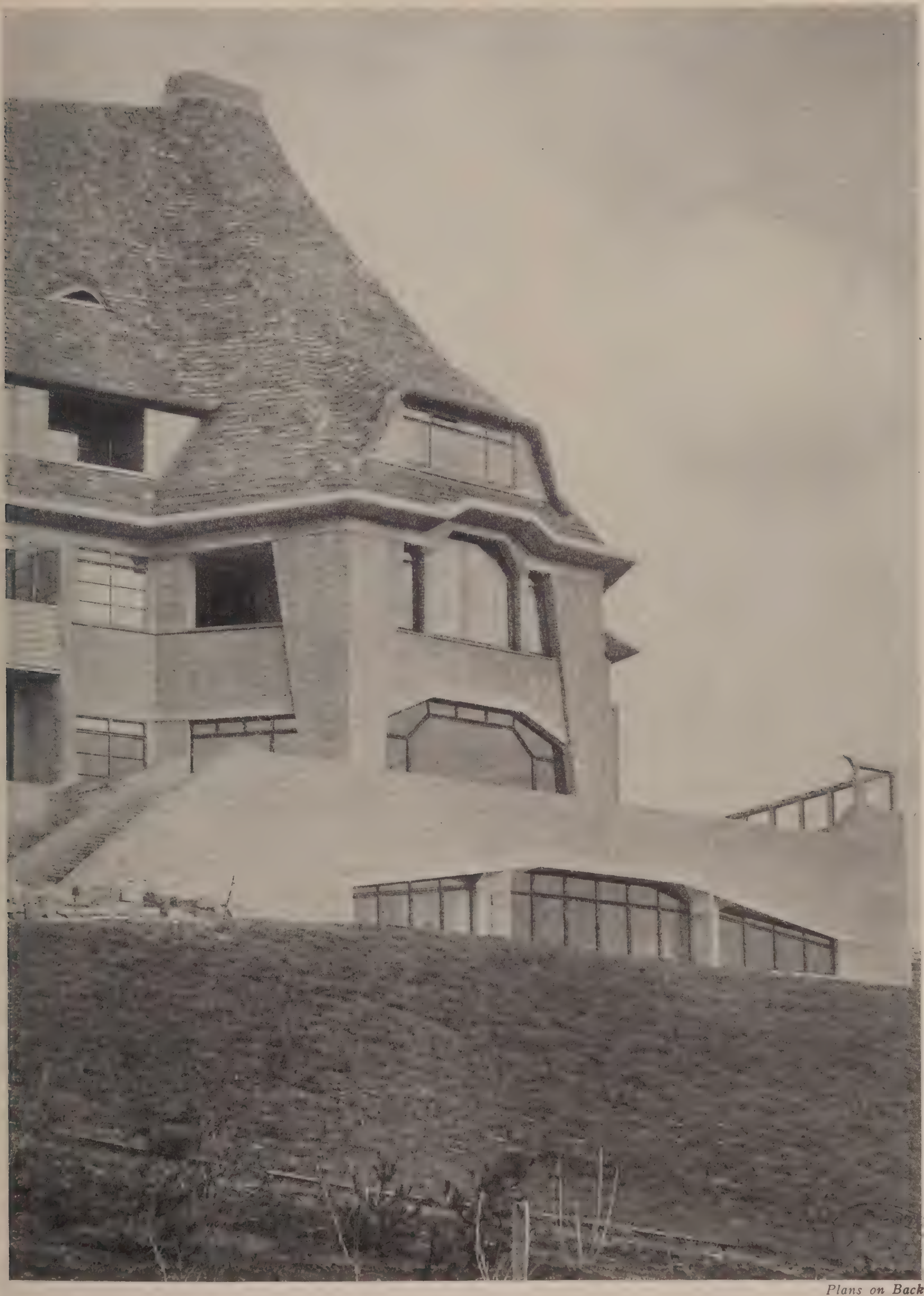


SECOND FLOOR



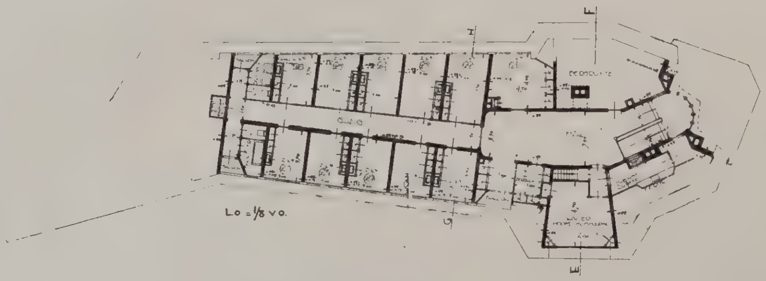
FIRST FLOOR

PLANS: RUDOLF STEINER CLINIC, THE HAGUE
JAN W. E. BUIJS, ARCHITECT

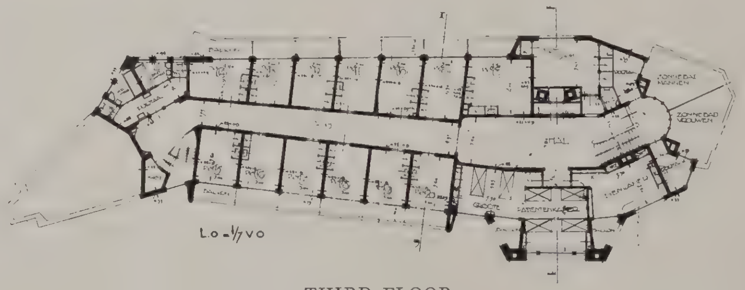


Plans on Back

DETAIL OF BAY, RUDOLF STEINER CLINIC, THE HAGUE
JAN W. E. BUIJS, ARCHITECT



FOURTH FLOOR



THIRD FLOOR

PLANS: RUDOLF STEINER CLINIC, THE HAGUE
JAN W. E. BUIJS, ARCHITECT

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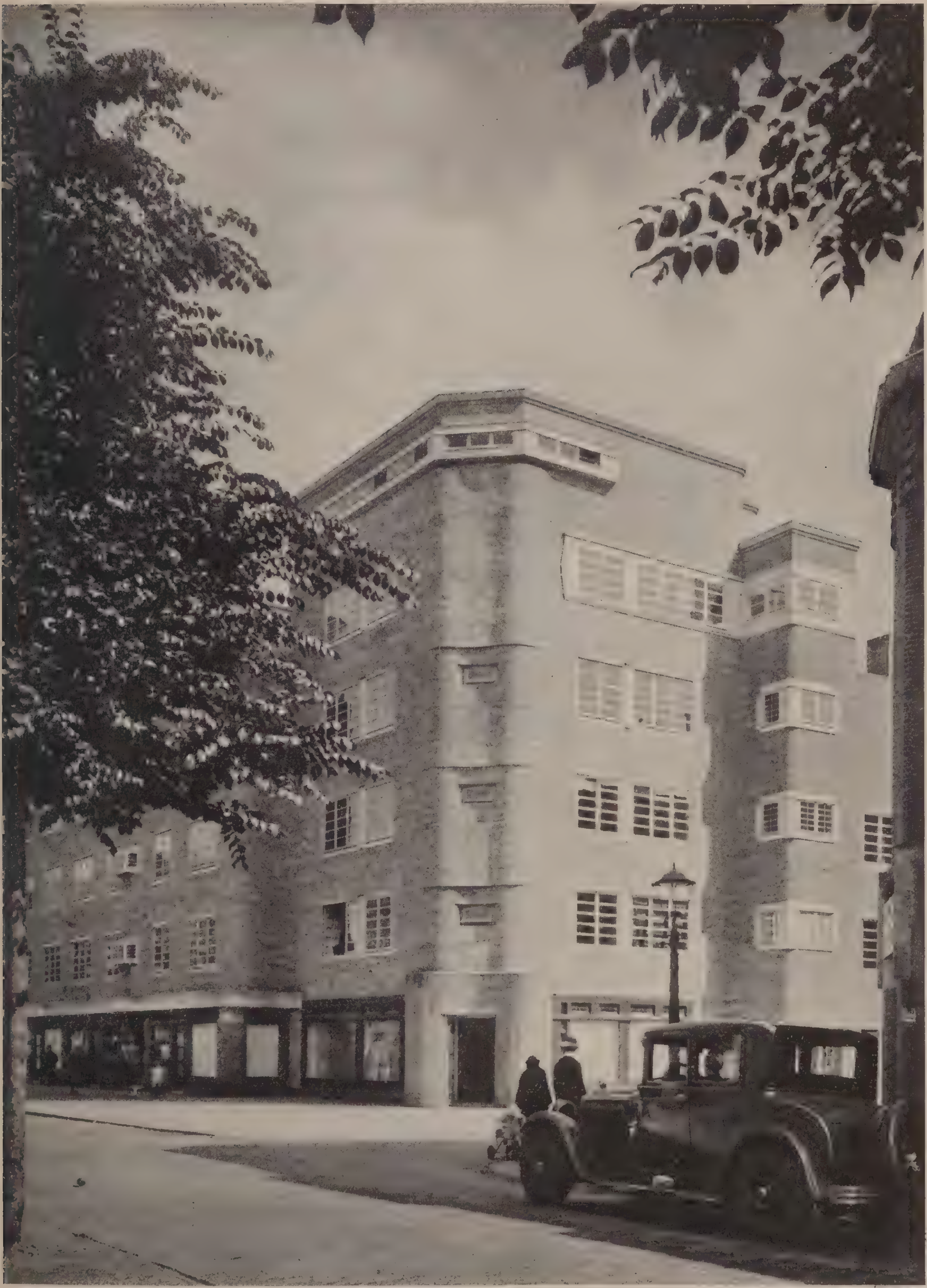
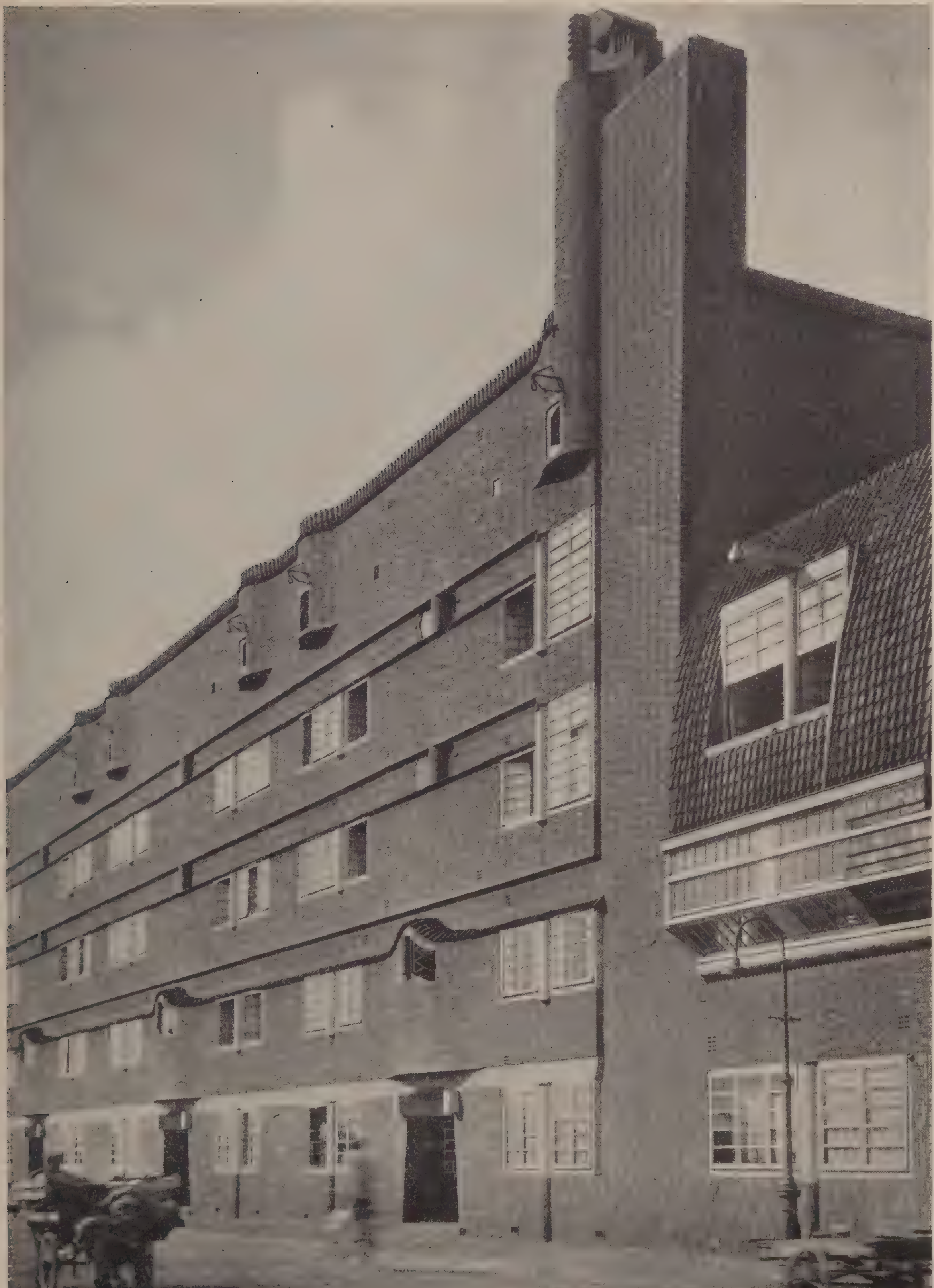


APARTMENT HOUSE, AMSTERDAM
PETER KRAMER, ARCHITECT



APARTMENT HOUSE, AMSTERDAM
S. DE KLERCK, ARCHITECT

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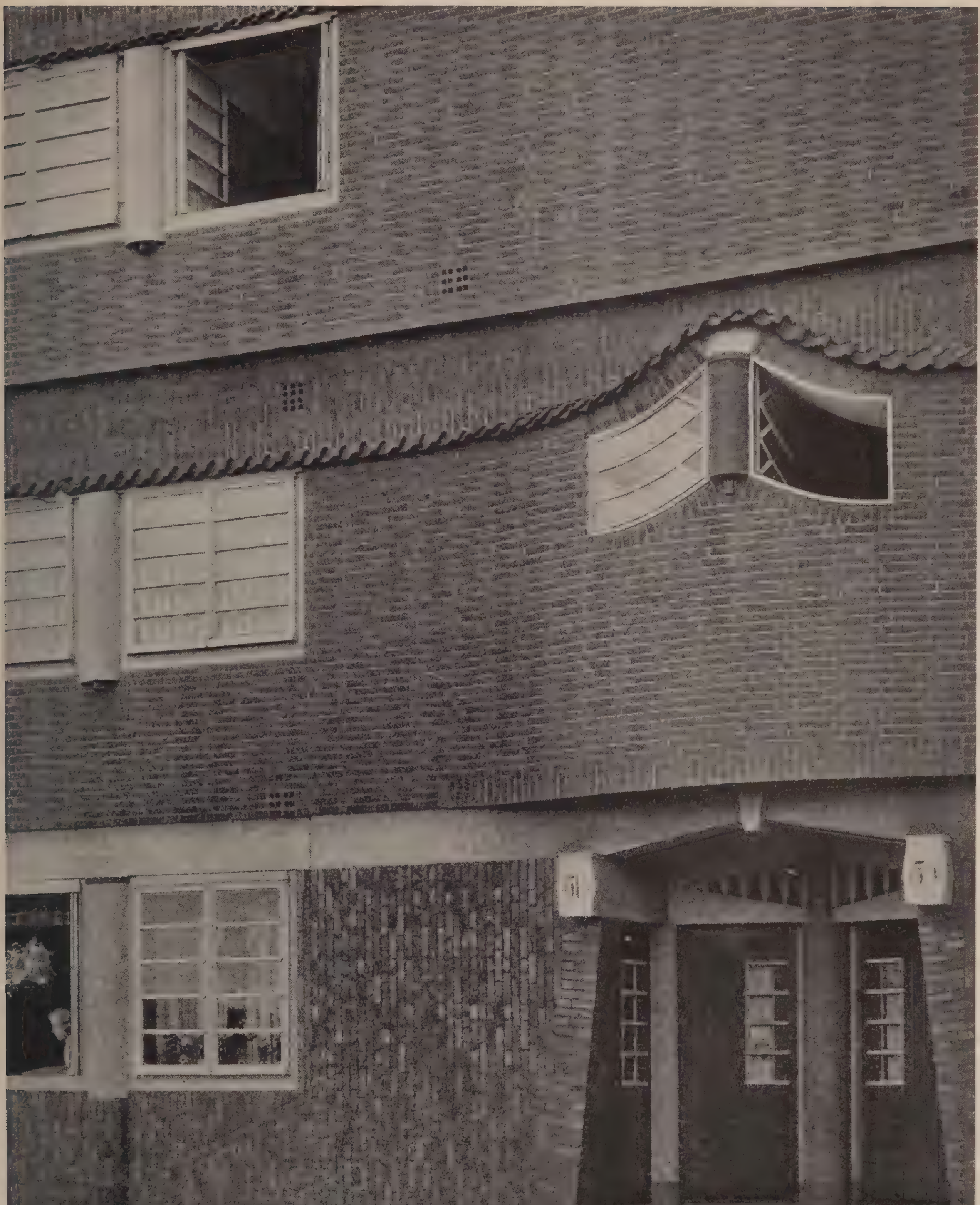
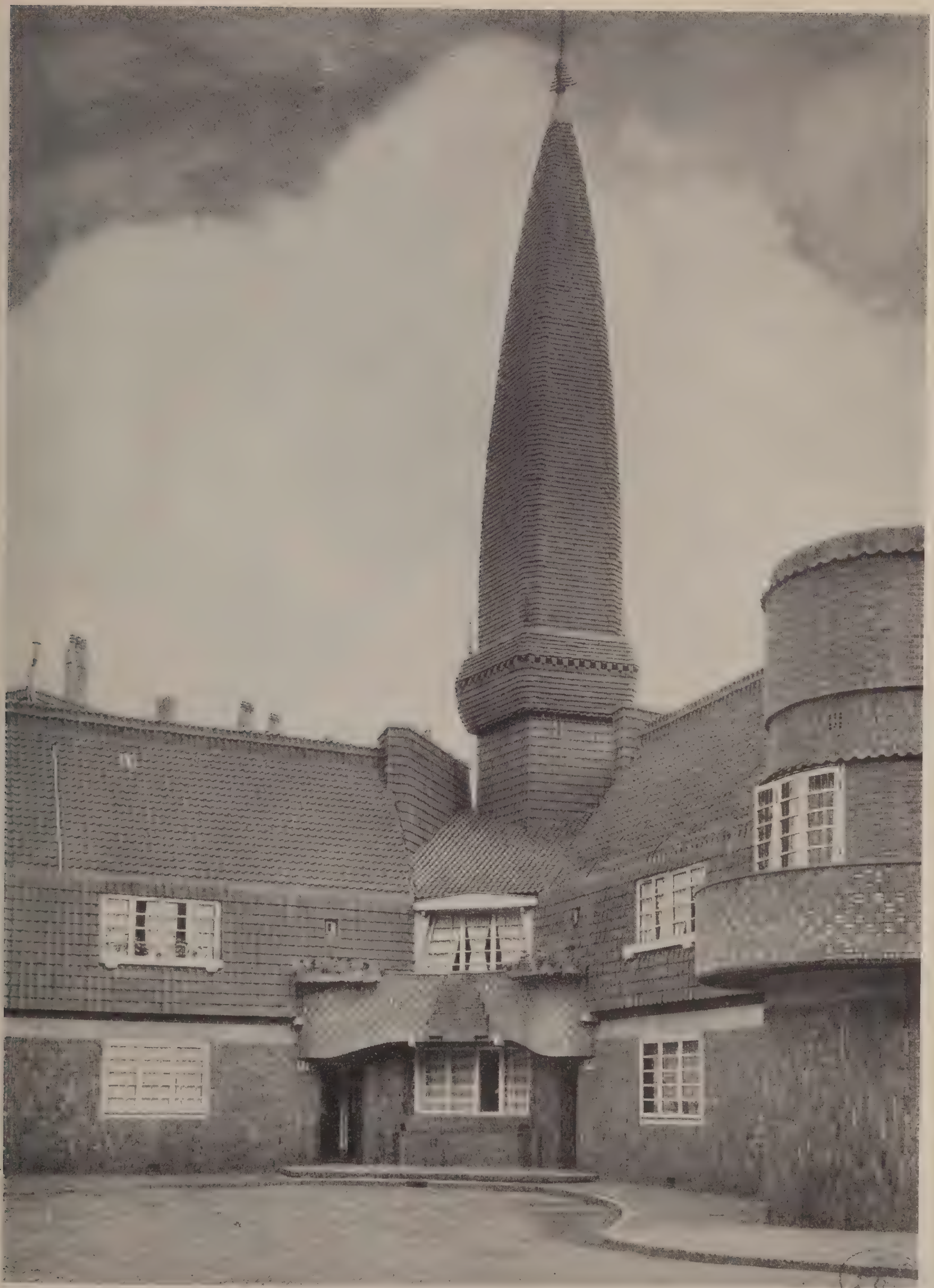
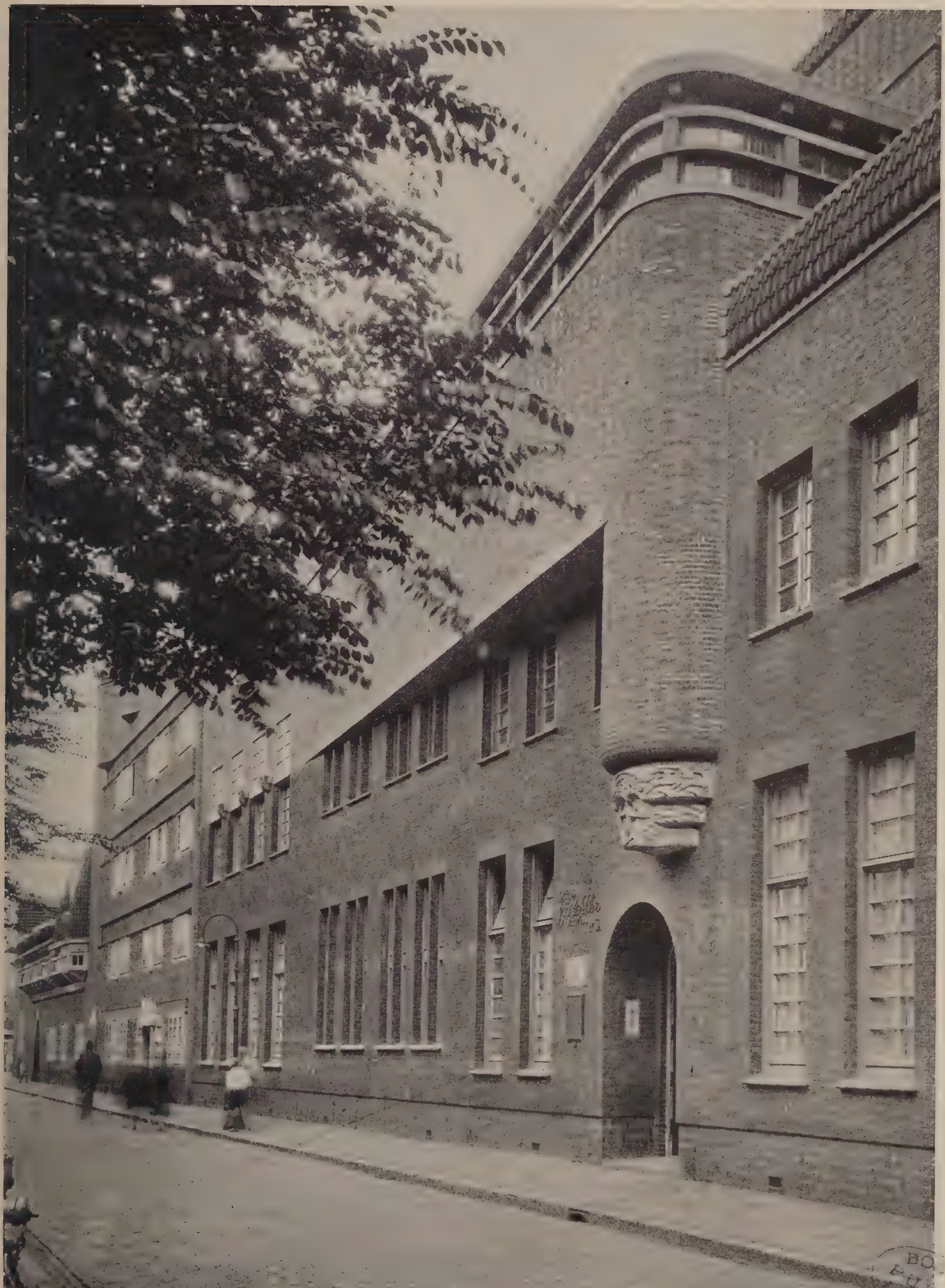


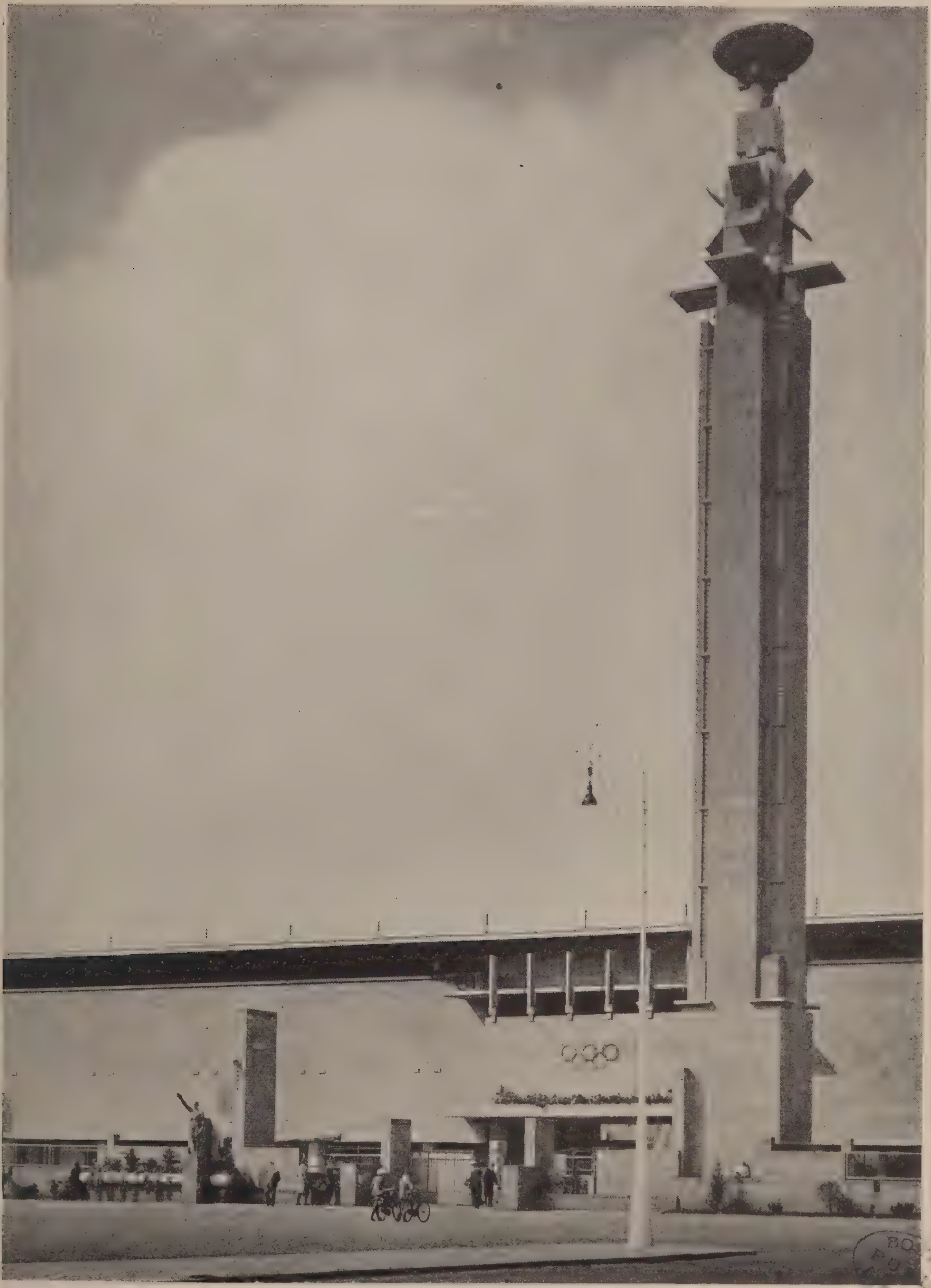
DETAIL, APARTMENT HOUSE, AMSTERDAM
S. DE KLERCK, ARCHITECT



DETAIL, APARTMENT HOUSE GROUP, AMSTERDAM
S. DE KLERCK, ARCHITECT



SCHOOL IN APARTMENT HOUSE GROUP, AMSTERDAM
S. DE KLERCK, ARCHITECT



OLYMPIC STADIUM, AMSTERDAM
JAN WILLS, ARCHITECT

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THE REJUVENESCENCE OF WROUGHT IRON

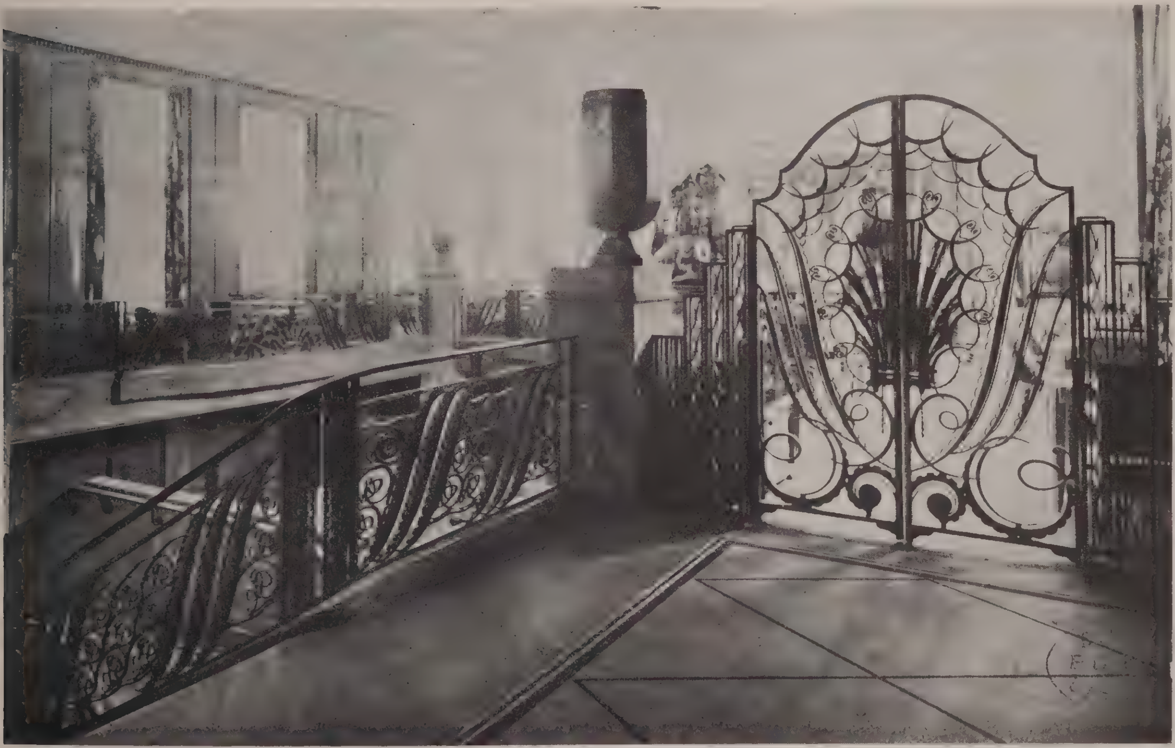
PART TWO

BY

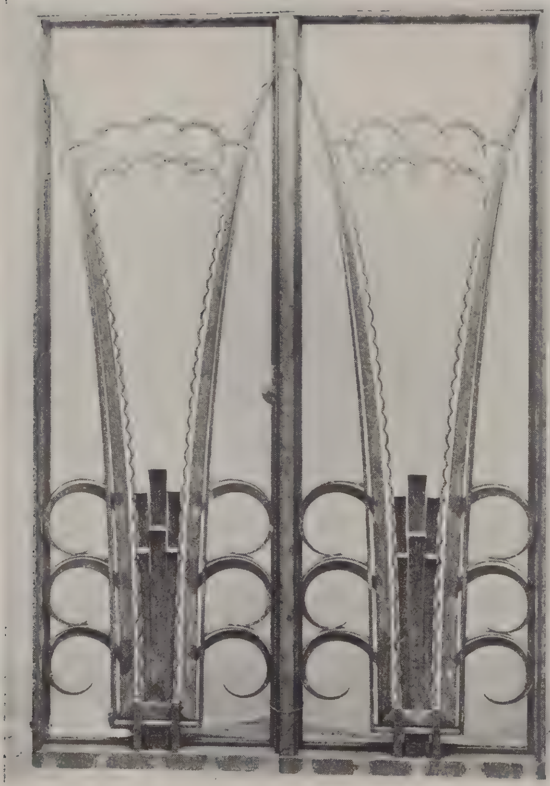
W. FRANCKLYN PARIS

IN the January issue of THE FORUM something was said regarding the excellent metal work being produced by the French *ferronniers* and the striking beauty of many of the effects which they secure. One of these effects, which is of particular interest, is used by Brandt in many of his pieces where gold and silver contrasts are graded through oxidation as in the door, *"Les Cigognes,"* where a Japanese flavor is imparted by three storks in flight, and the supple and pliant composition, *"Les Bouquets,"* where light and shade effects are obtained by roughening some of the surfaces so that they may catch the light at certain angles. Where the door is to be exposed to the weather, Brandt's forge work is more massive, and the iron is allowed to show the marks of the hammer, as in one outer door in which pine needles and cones are used as a decorative motif. If the door's function is to be performed indoors, the metal is smooth and polished as in a dining room door picturing grapes clambering up a trellis. Brandt also executes designs commissioned by architects and decorators, and his role then becomes that of manufacturer, when credit or blame for the visual effect produced must properly belong to the designer or the composer, and not to the *ferronnier*. The stair rail executed for Paul Poiret shows at once that it is not the brain child of Brandt. It is the conception of the famous brothers Perret, the architects of that ultra-modern church of Raincy, which created a sensation in the architectural world some five years ago. Messrs. A. and G. Perret are radicals in art, and in their warfare against tradition and routine they have committed many geometrical atrocities.

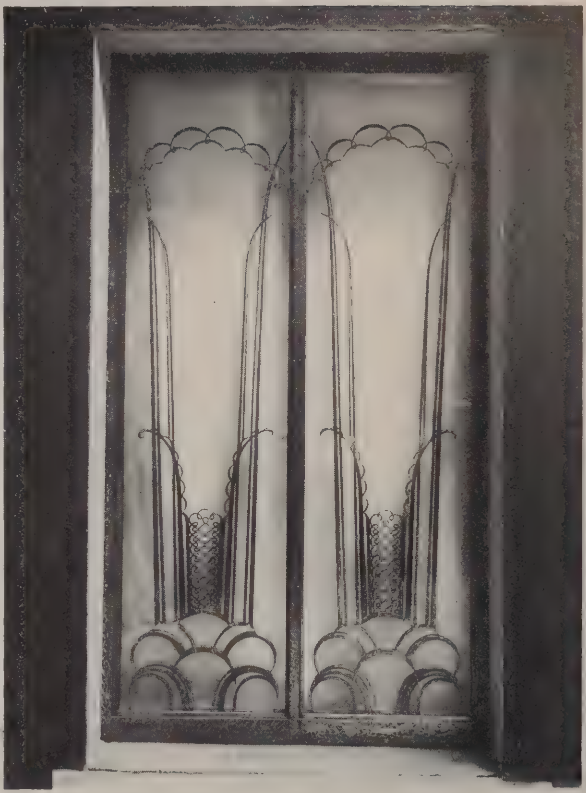
The public has been reproached so severely for having laughed or hissed in a few celebrated cases when it should not have done so, that it now maintains a prudent silence when confronted by hideous "art" committed under the alibi of "originality." Some of the modernists have taken advantage of this attitude of the general public and,—to use a picturesque colloquialism,—have "gotten away with murder." The theory that "loveliness needs not the foreign aid of ornament but is, when unadorned, adorned the most," is all very well, but when carried to extremes it yields an architecture of sharp angles, when packing cases piled one atop of another take the place of line, of balance and proportion, and where na-



Rail and Gates, Grand Staircase, French Line S.S. "Ile de France"
Designed by Raymond Subes. R. Bouwens de Boijen, Architect

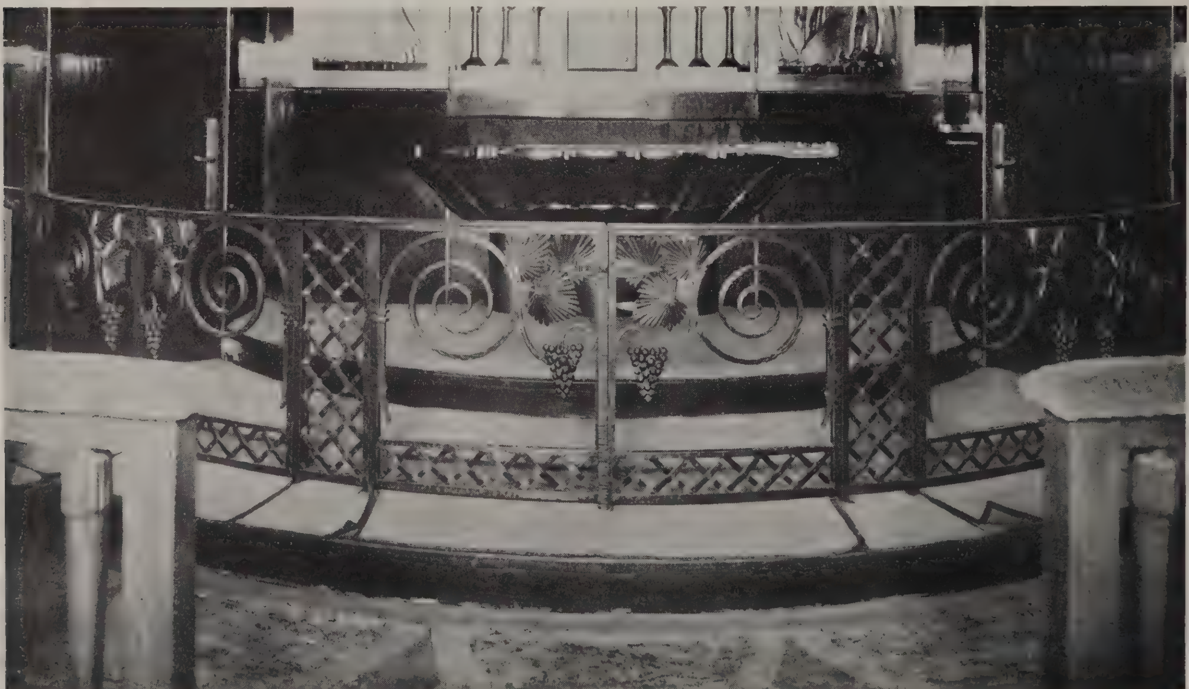


Gates, S.S. "Ile de France"
Designed by Raymond Subes. R. Bouwens de Boijen, Architect

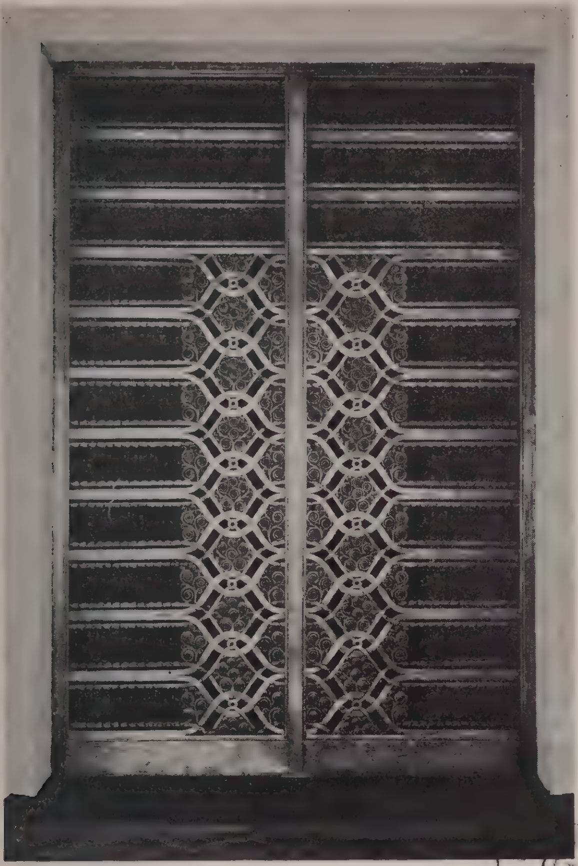


Grille Suggesting a Fountain
Designed and Executed by Raymond Subes

kedness without form and parading as simplicity vainly attempts to do to our emotions what may be attained only by golden visions and romantic dreams. The Perrets and the Mallet-Stevenses and other apostles of the straight line no longer make a noise when they explode, however, and



Communion Rail, Chapel on French Line S.S. "Ile de France"
Designed by Raymond Subes. R. Bouwens de Boijen, Architect



GRILLE FROM SALON DES ARTISTES
DESIGNED BY RAYMOND SUBES
M. HENNEQUET, ARCHITECT

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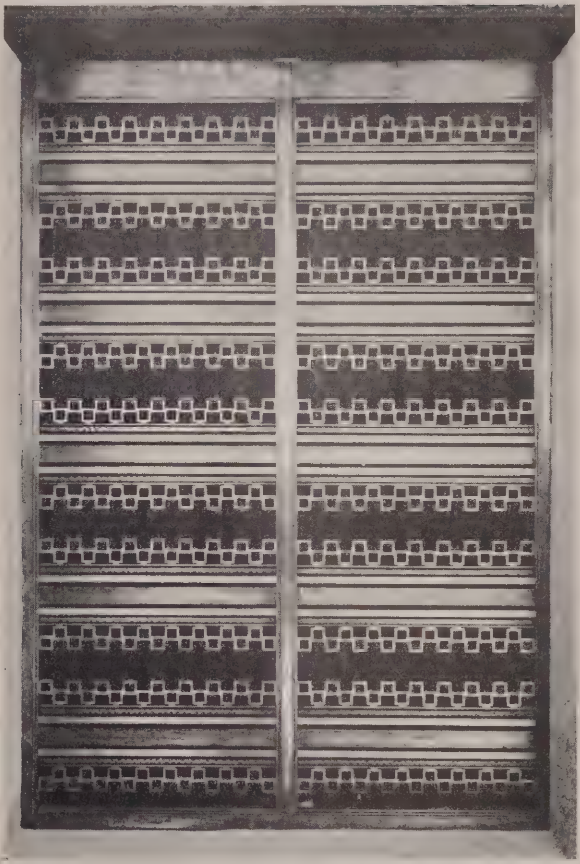
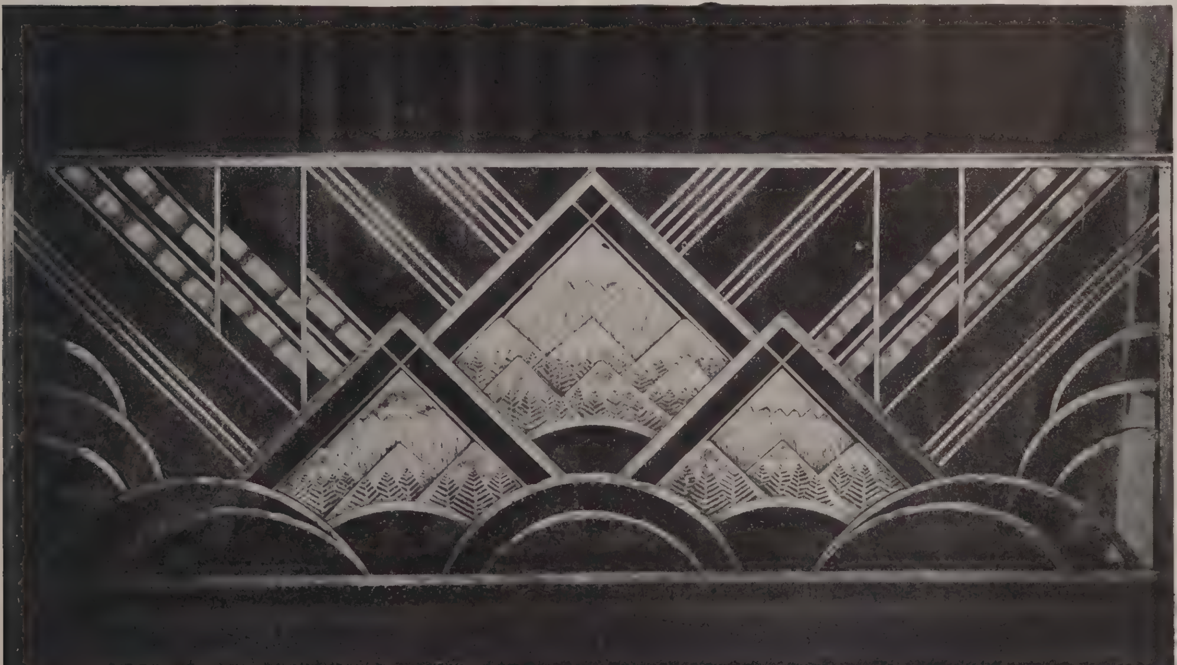


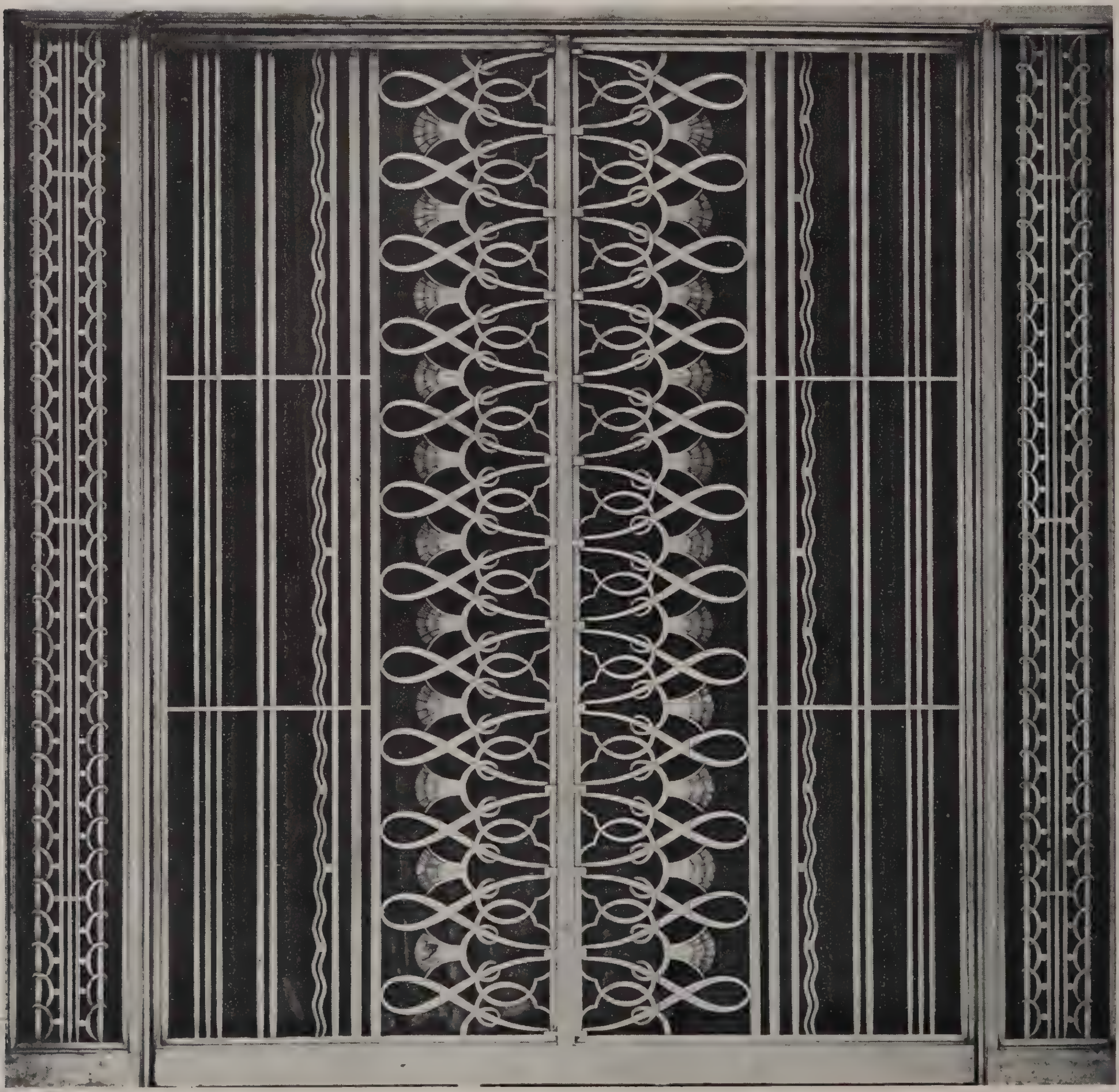
GRILLE IN BRONZE FOR DOORWAY
DESIGNED BY M. PATOUT, ARCHITECT
EXECUTED BY RAYMOND SUBES



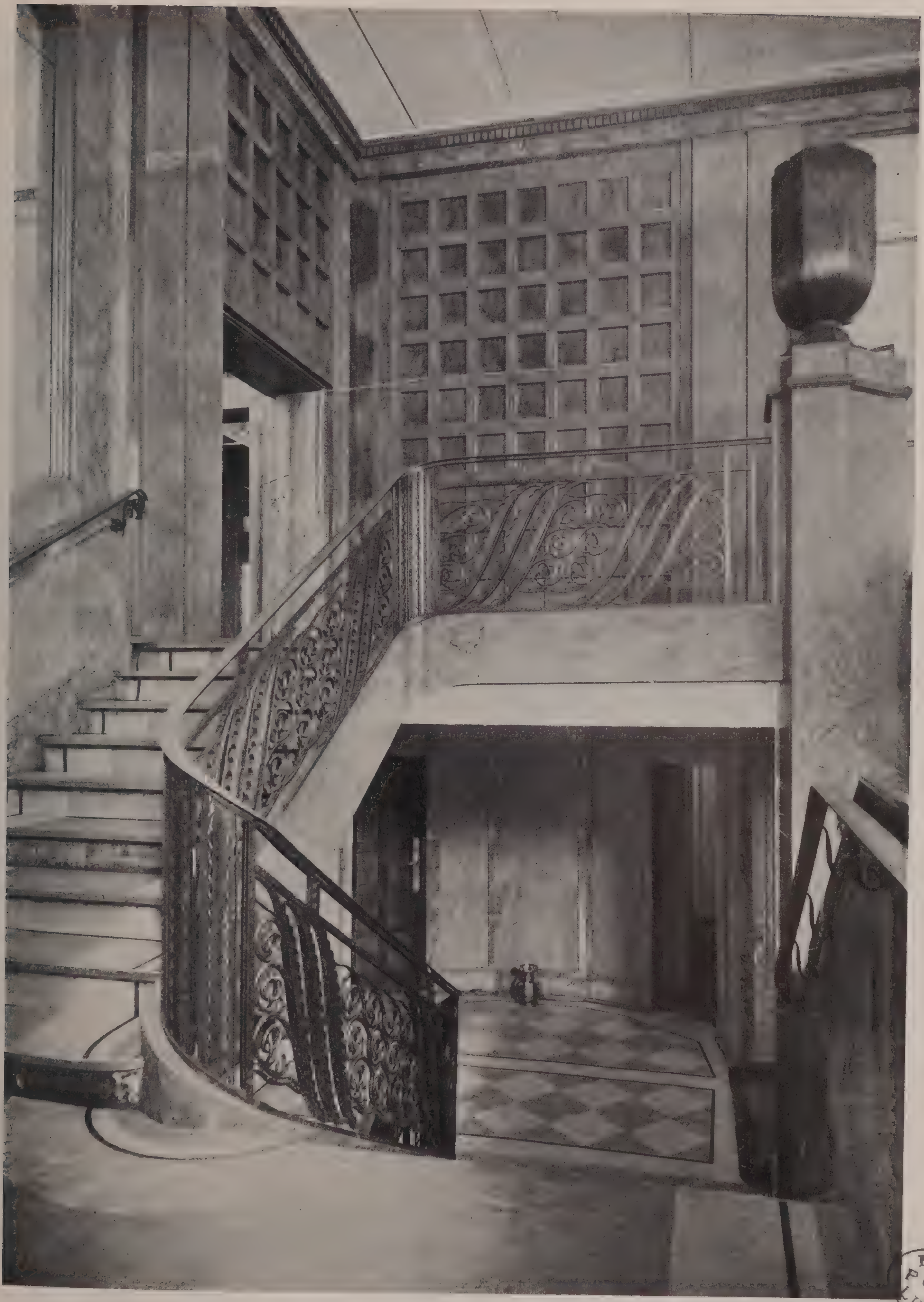
BALCONY RAILING FOR THE PARAMOUNT THEATER, PARIS
M. MORGEAND, ARCHITECT

the extremists are all putting plenty of water into their wine. The tendency is still toward a virile style as contrasted with the effeminate expression prevalent under Louis XV, but as Nature has created very few square leaves on very few perfectly perpendicular trees, very few trapezoid men and women, and even fewer octagonal or rectangular clouds, the curve has come once more into favor. How much can be done with it, without abandoning the modern feeling, is exemplified in a baluster of wrought iron and bronze for a music room in Nice, where dancing figures are set in a delicate iron tracery of graceful volutes, and in an interior door, where conventional flowers are disposed in the intervals left by serpentine vines, crinkled and curly, all this in metal.

Space is lacking here in which to illustrate and analyze the work of all the *ferronniers* who are bringing fresh luster to the art of metal working in France, but in order to portray the diversity of expression that may exist among them, a few examples of the work of Raymond Subes may prove of value. Subes, like Brandt, is a disciple of Robert, but his mood is less sprightly than Brandt's, —more austere. He uses welding, but likes to leave on his metal the impress of the hammer. He seems to employ the modern technique with reluctance and to shun polished and finished effects. One of his latest productions, a balustrade for the Paramount Theater now being built in Paris, reflects his fondness for massive effects and rough surfaces. He is frequently employed to materialize the conceptions of others, but generally the architects who patronize him do so because they like his solidity of expression. Those who want delicacy or lightness generally commission Brandt



Grille Designed and Executed by Raymond Subes



STAIR RAIL, FRENCH LINE S.S. "ILE DE FRANCE"
DESIGNED BY RAYMOND SUBES. R. BOUWENS DE BOIJEN, ARCHITECT

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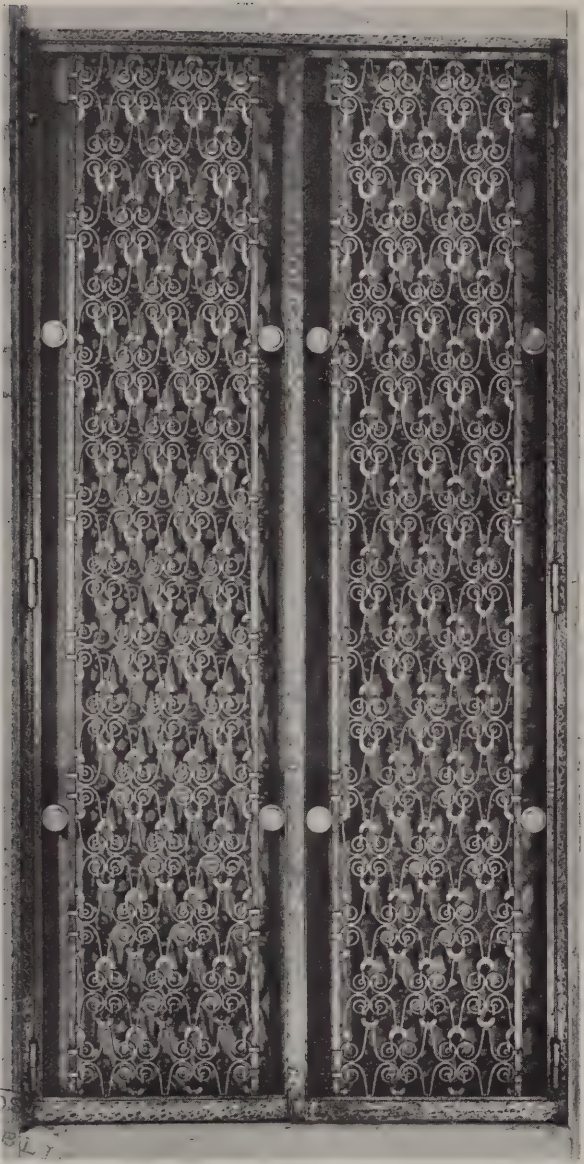

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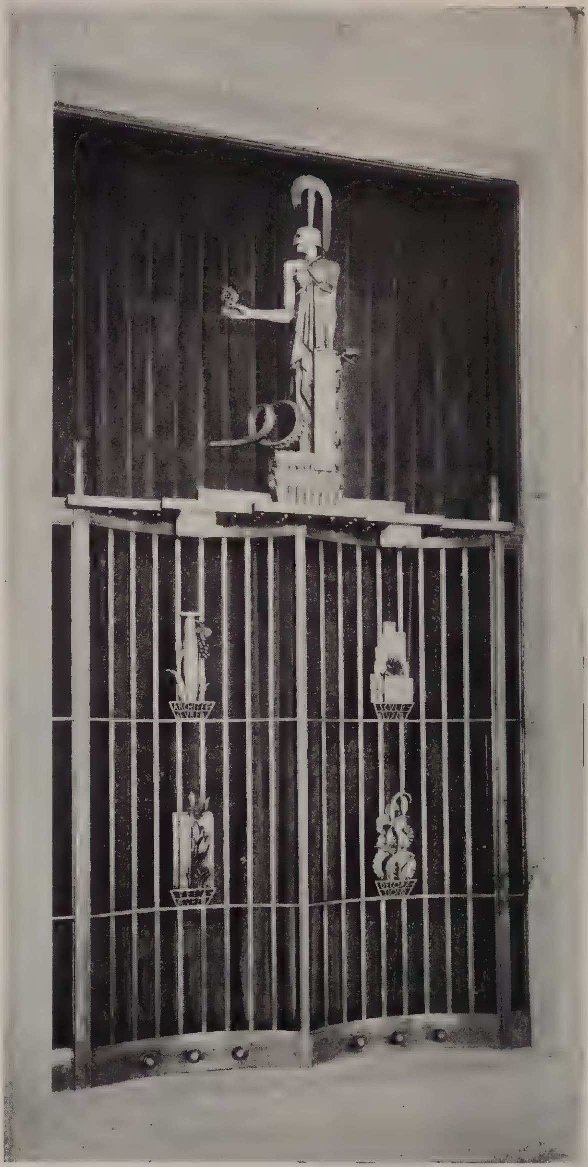
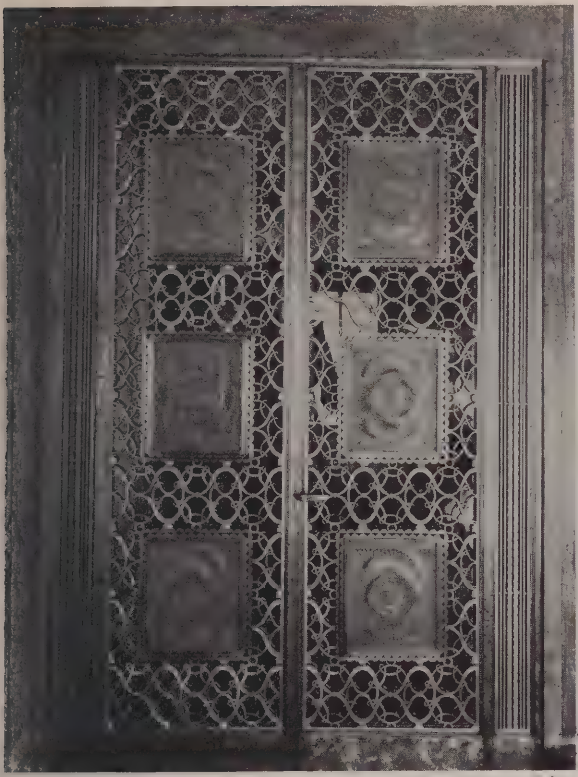
Door Grille
Designed and Executed by Raymond Subes



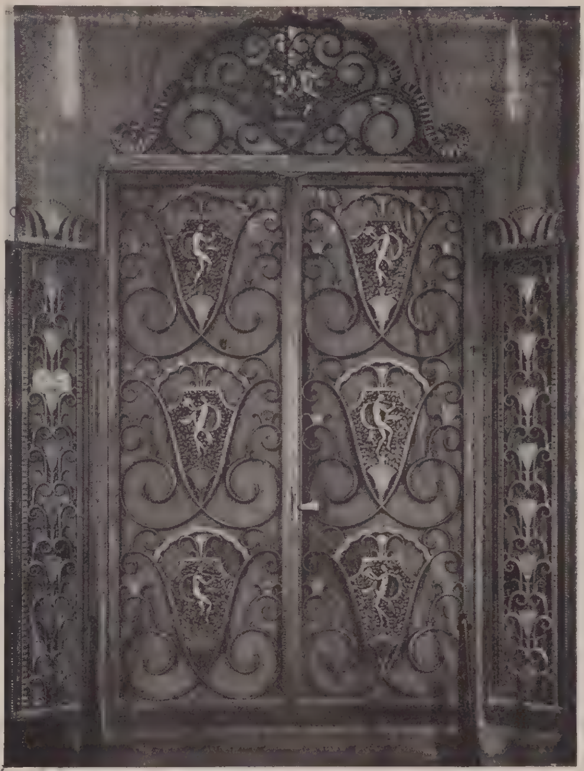
Entrance Gates
Designed by Raymond Subes, M. Expert, Architect

or Szabo to express it for them. Subes is for severity, for *martele* effects, for straight lines and geometrical simplicity. His work on the French liner, *Ile de France*, shows that he can employ the sinuous when the occasion requires it. The S.S.S. motif utilized in the balustrade and stair rail is inspired by the undulating movement of the ocean wave. The swelling effect, the sweep of the sea, is well expressed. His treatment of the altar rail and grille to the chapel of the ship reveals his fondness for rough-hewn metal. Occasionally he forgets that *meuble* signifies "mobile," and some of his furniture is so ponderous as to be doomed to immobility. He is the perpetrator of a folding screen in metal, a *paravent*, literally, a shield against drafts, which not only keeps off the wind but which could easily keep off the outpourings of a machine gun! Why a windshield should be made of armor plate is one of the mysteries of the age. It is so heavy that two strong men are needed to move it! Lest the reader be left with an impression of clumsiness and a feeling of malappropriate treatment, however, we illustrate an outer door in which are embodied the artist's mastery of the new technique and his feeling for curvilinear ornamentation. The framed panels are of opaque pressed glass, and the effect produced is festive and airy, appropriate to its use.

What the *ferronniers* of France are doing in the lesser field of lamps and lighting fixtures, locks and door handles is just as admirable as what they are doing in the larger field of archi-



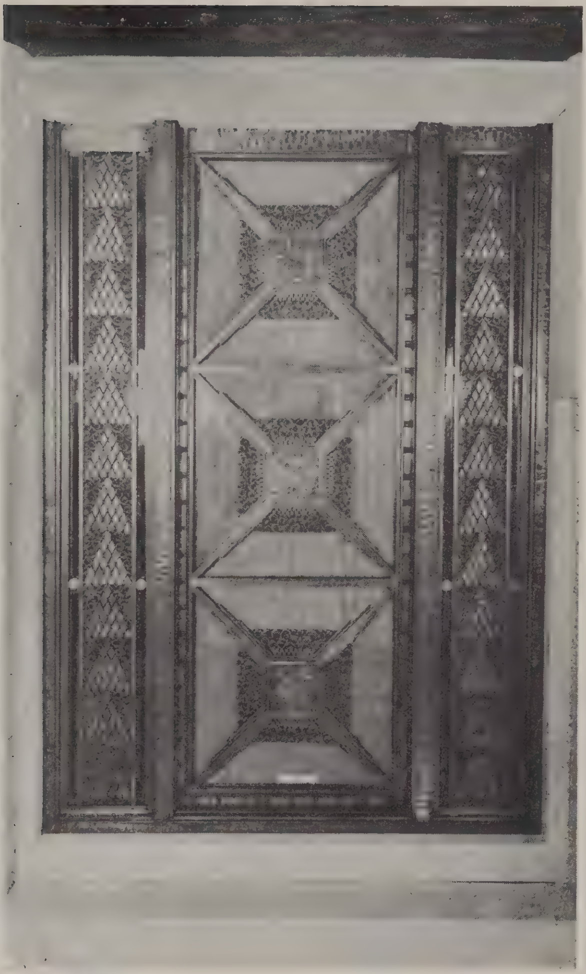
Grille
Designed and Executed by Raymond Subes



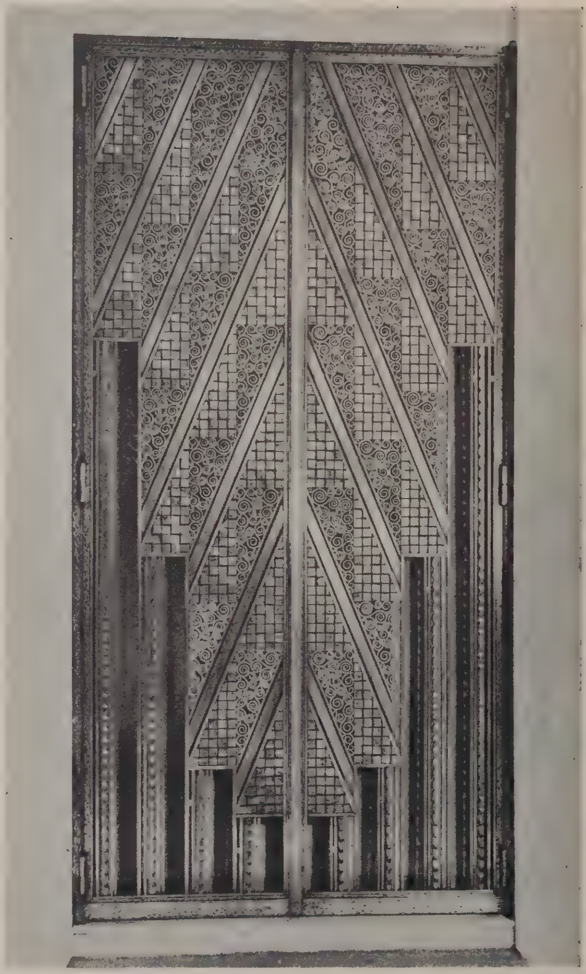
Gates
Designed and Executed by Edgar Brandt

tecture and the decoration of interiors. The lesson to be drawn is that in America, where building activity is greater, where new apartment houses and office buildings are springing up by the thousands to Europe's hundreds, the opportunity exists for a fine blossoming of metal ornamentation, opportunty much greater than that which prevails in France. There are no technical difficulties that our metallurgists cannot solve as well as the French technicians. There are no financial obstacles. The wealth is here, and if industrialists can be found to finance automobile plants, they should be found to finance ateliers of *ferronnerie*. The artists cannot do it alone; there must be coöperation with industry. More and more will we be concealing our prosiac radiators behind artistic wrought iron screens; perhaps some day we shall want an individual radio container of unique design made of metal, a cabinet in the lighter-than-aluminum alloy, of which the framework of Zeppelins is made, that will have no duplicate. The caprice of women for "creations" in hats and gowns would be more plausible if expressed in a desire for the exclusive in mirror frames, consoles, telephone instruments, lamps and a score of personal objects with which they must live in intimate contact for years instead of for weeks or months. What church would not be embellished by having its organ pipes concealed behind a stately wrought iron screen, or a bronze and copper grille with sculptured figures set in, as in Brandt's *"Age d'Or"* gate? Think of all the elevator cages, the shop window back drops, the porch balusters that could have individuality. What Daniel Chester French and Andrew O'Connor did in stone for the portico of St. Bartholomew's, some *ferronnier* can do in metal for the entrance to a bank or a hotel. The Fifth Avenue shop that would have a personal, unique, exclusive, distinctive, wrought iron screen against which to display its wares, would acquire a certain individuality.

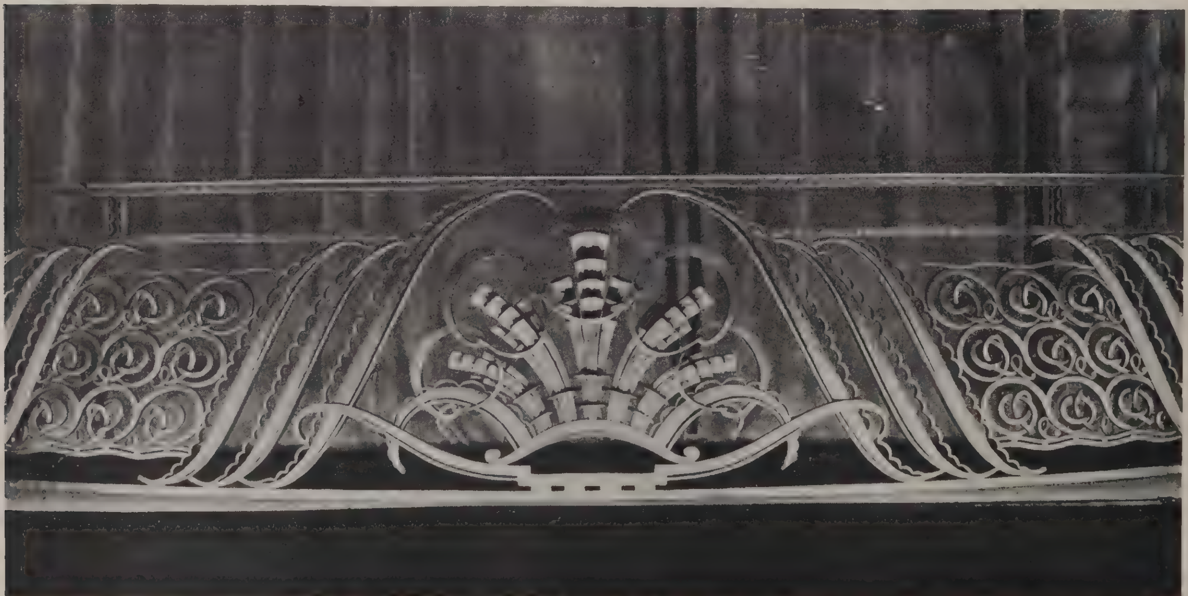
The possibilities are endless. Perhaps we have not the craftsmen-artists to execute all the work that might reasonably be expected. We have, however, able architects and artistic designers in whom the sense of ornament is highly developed who could draw cartoons for execution by the *ferronniers*. The limitations to expression in metal have been removed. The time element no longer exists. Almost anyone with a sense of proportion and an eye for beauty can design a pattern that will be translatable into iron, if he will observe the rule of fitness to purpose. There are nameless graces which no methods teach, but where the will exists a way is generally found. The hour is propitious for the flowering of *ferronnerie* in America if desire for this blossoming is given expression by architects and decorators.



DOOR FROM THE SALON DES ARTISTES
DESIGNED AND EXECUTED BY RAYMOND SUBES



UNUSUAL BRONZE DOOR GRILLE
DESIGNED AND EXECUTED BY RAYMOND SUBES



DETAIL OF THE STAIR RAIL, FRENCH LINE, S.S. "ILE DE FRANCE"
DESIGNED AND EXECUTED BY RAYMOND SUBES

THE BAGATELLE

BY

KATHARINE STANLEY-BROWN

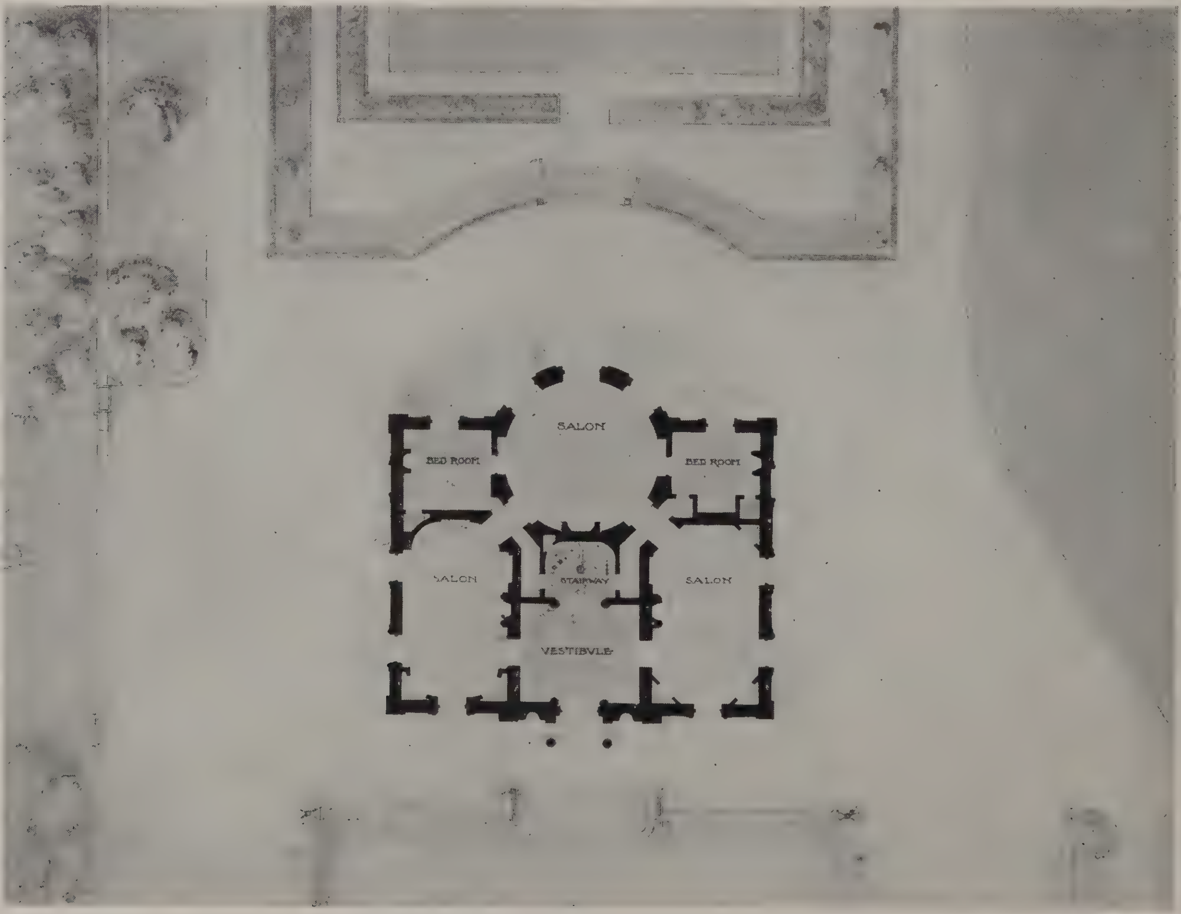
WE pass the marvelous iron grille whose black curves throw wavering shadows across the sun-streaked lawn, pass the gay little pavilion (can one believe it ever housed anything as prosaic as a guard?) and are in the gardens of the *Bagatelle,* gardens that, filled as they are now with riotous children and toddling babies, seem never to have lost their dignity and their stately grace, which, with a touch of irrepressible gaiety as well, was their legacy from the eighteenth century. The path meanders past tall oaks, trees of boxwood trained into unusual shapes, lindens with mossy trunks, and pink horse chestnuts, and where the ground is bare beneath the shadows, glossy ivy clusters in wide circles. We pass a little gate, a broken tower, and a stone door with some carving of the thirteenth century. They are all incidental in the gardens, like the grotto of the philosopher, the tall and rather grotesque water tower, the arched bridges over infinitesimal pools, surprises for the eye, fabrications which by their very artificiality cast a wider dignity upon the giant oaks and the quiet lawns. The path winds past the stables, no longer used for horses, but transformed now into a chic little tea house, *La Roseraie,* where, while one eats ices and munches *petits-fours,* the eye is constantly delighted by the gardens beyond. The end of the *orangerie* is visible, as is also the tiny picking garden, outlined by hedges lower than the general level of the grounds, whose ascending steps are marked by sky blue Italian pots full of passion flowers. The drinking fountains beside the stable doors have undergone a transformation also. They are filled with petunias, which blow softly back and forth in the gentle August breeze.

Summer in France! Delicious, sun-filled air drifting lightly past one, great bundles of white clouds in the blue clear sky above, and the *Bagatelle,* that charming plaything of the eighteenth century, which remains untouched, delicate and rare, in the midst of its gorgeous gardens. That tiny, buff colored chateau, its windows gay with overhanging white swags of fruit and flowers, seems just the building to find in the midst of so much beauty, just the plaything to expect. It is approached formally. Two small square gate houses, one boasting a clock, the other a compass, open upon a graveled court of honor. Between the little buildings two tall horse chestnuts rise by intention or training to exactly the same height. Terraces extend around the court of honor, their low walls with their ivy-covered windows concealing rooms approached on a lower level, where domestics could be housed. On the right of the court is the little museum, built in the nineteenth century, but, charming as it is, we scarcely notice it, for at the end of the graveled stretch, square and shining in the sun, is the delicious, symmetrical, charming facade of the *Bagatelle.* The entrance doorway is flanked with pink marble pillars, the iron railing above is a miracle of design. High up on the facade the words *Parva sed Apta* are painted in gold across a black band. "Little but just right," it might be freely translated, remembering Peter Ibbetson and his beautiful little Mimsey Seraskier who lived in a house of that name. The two wings adjoining the central pavilion are scarcely wider than their single windows, and the whole building is crowned with the most charming copper dome, rising in shell-like form to a crest, a circle of swags and lions' heads. A tiny flag-pole rises from the center of this dome. Does it fly a pennant sometimes with the *fleur-de-lis* of France, I wonder? It would seem appropriate to find the colors royal here. For it is just the resting place for a queen, that queen whose tiny feet had led her through a life which knew naught save *"l'elegance, l'amour, le chic."* To take her through her last months, to behead her, these indeed were inappropriate gestures, sufficiently cruel for those of lesser clay. It was to rest her, to please her, that the *Bagatelle* was built.

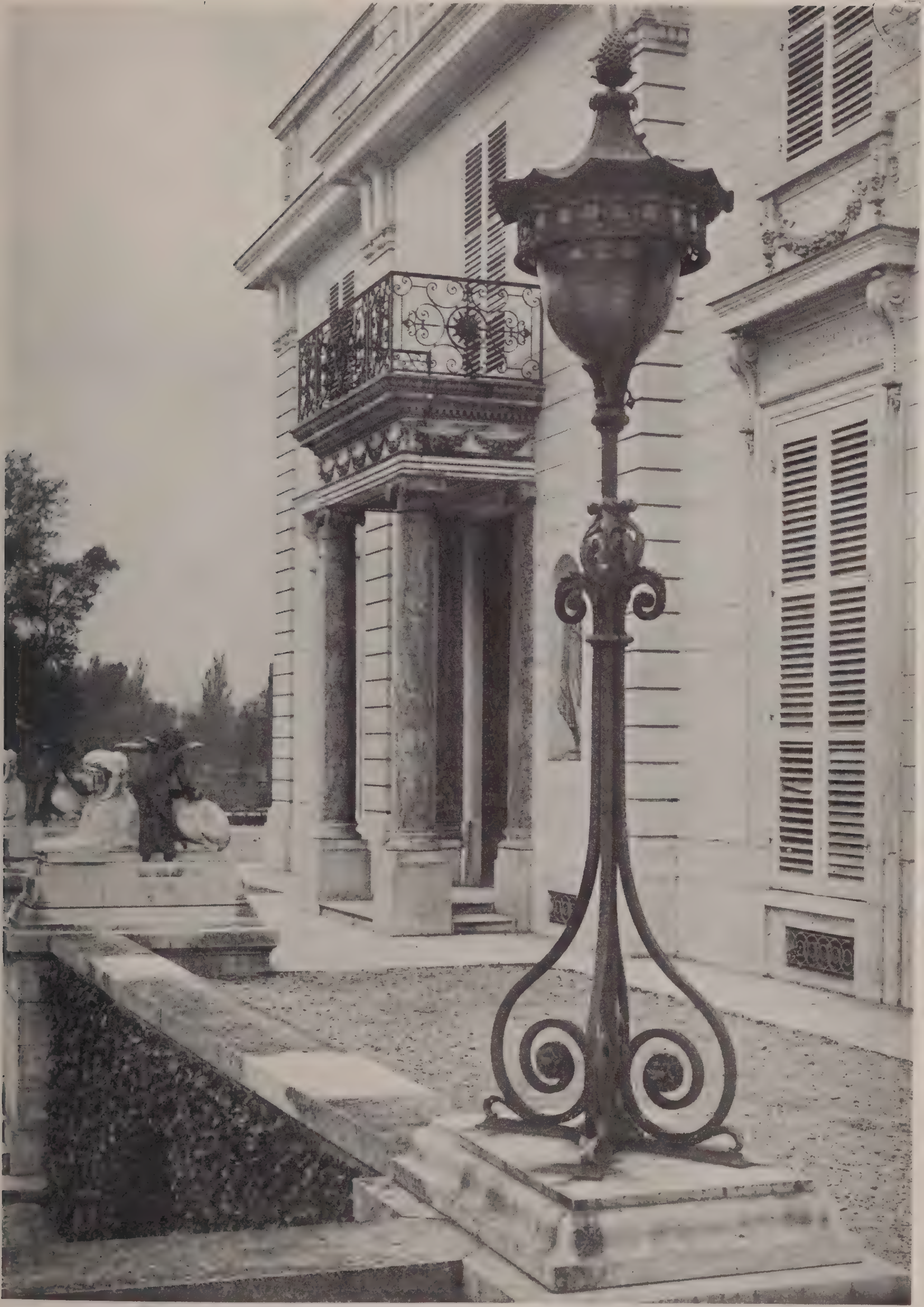
On October 22, 1777, the Comte d'Artois, he who was later to be Charles X, wagered a million francs with his pretty sister-in-law, Marie Antoinette, that before she returned from Choisy, where they were residing, to her palace at Versailles, just nine weeks from then, he would offer her a perfect little gem of a house in which to break her journey. The queen, incredulous, took up the bet. Indeed, and who would not? Sixty-four days! She knew the Comte d'Artois had recently bought the *Bagniole,* a dilapidated little thatched roof house in a lovely park on the edge of the Bois de Boulogne, which, though made famous by the excesses of its occupants under the Duchesse d'Estrees, the Prince de Chimay, and others, had been allowed to fall into complete disrepair. But that he, a mere lad of 17, could rebuild this, not alone rebuild, but decorate and furnish it and make it fit for the Queen of France to spend the night in, was incredible. And in 64 days! She had no worries about her wager!

The Comte d'Artois lost no time. He made his bet on the 22nd of October. On the morning of the next day 900 men were assembled and ready to start work on his *casin* as he called it, or little house. As the workmen hammered and sawed, the Comte's friends assembled on the terrace to see the marvel grow. He pointed his cane at it, and laughed: "It's nothing, a mere bagatelle!" and the name has clung to it ever since. His architect, Belanger, a great favorite at court, the originator of a thousand royal fetes and spectacles, fell into the spirit of the scheme at once,—something rare, something tiny, and yet not too gorgeous for its rural setting. He laid out his plans, and surrounded himself with artists. Dussaulx came to paint arabesques on the delicate white and gold panels of the tiny rooms; L'Huillier's chisel rang as the nymphs and sphinxes took their places; Gouthiere contributed ten charming fireplaces with mantels in marble and bronze, long since celebrated. A Scotch gardener, Blaikie, laid out the lawns and pools and copses after the English fashion, but he coöperated with the French gardener, Chalgrin, to the extent of accepting his extraordinary suggestion that they plan the vistas after some of Hubert Robert's pictures. Chalgrin planned too the formal oblong garden plot behind the house. Its delicious straight lines of roses and tall leaden jars lead beautifully from the terrace with its sphinxes and cupids toward the willfulness of the pools and grottos and lawns beyond. All this was most expensive and most difficult to arrange, but the Comte's mind and heart were set on winning his wager and achieving his "bibelot." He resorted to strategy, certainly strategy not admirable even in those less circumscribed days. Not being able to secure enough of the necessary building materials, he ordered regiments of Swiss guards to station themselves at the gates of Paris and seize whatever came in that might be of use to them. To be sure the material was paid for on the spot, but as it had already been paid for in other quarters and naturally had its own destination, the complications were immense. However, nothing daunted the Comte, who ordered the laborers to work in shifts both day and night, so that in exactly nine weeks the *Bagatelle* was completed. To be sure it cost the Comte three million francs, but he had the queen's million, lost on her wager, to help him with the debt.

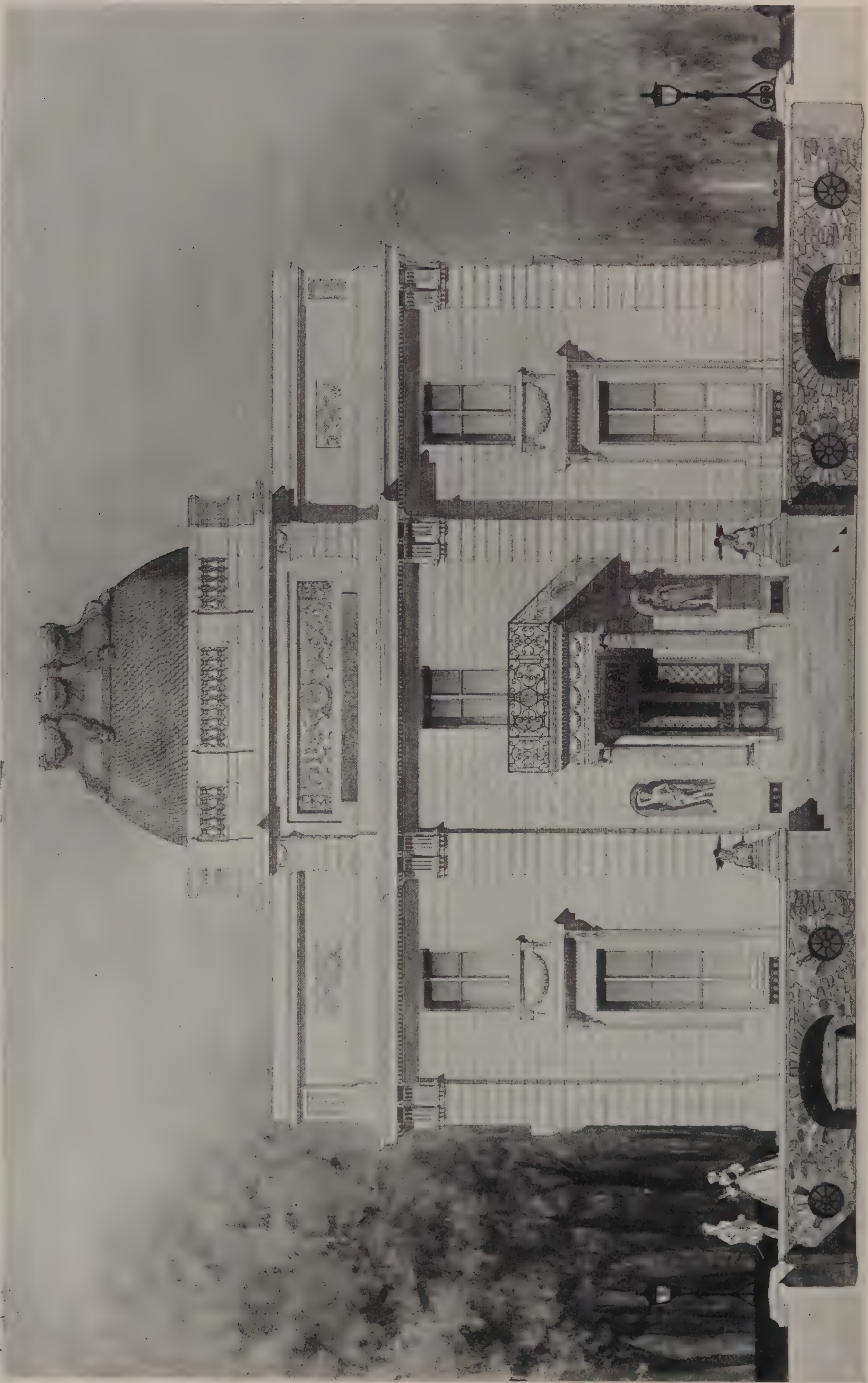
The *Bagatelle* was complete, the wager won, but sickness and mourning at court delayed the visit



Plan of Ground Floor, the Bagatelle, Paris
F. J. Belanger, Architect
From a Drawing by Rudolph Stanley-Brown



MAIN FACADE, THE BAGATELLE, PARIS
F. J. BELANGER, ARCHITECT



THE BAGATELLE, PARIS

F. J. BELANGER, ARCHITECT

FROM A RENDERED DRAWING BY RUDOLPH STANLEY-BROWN

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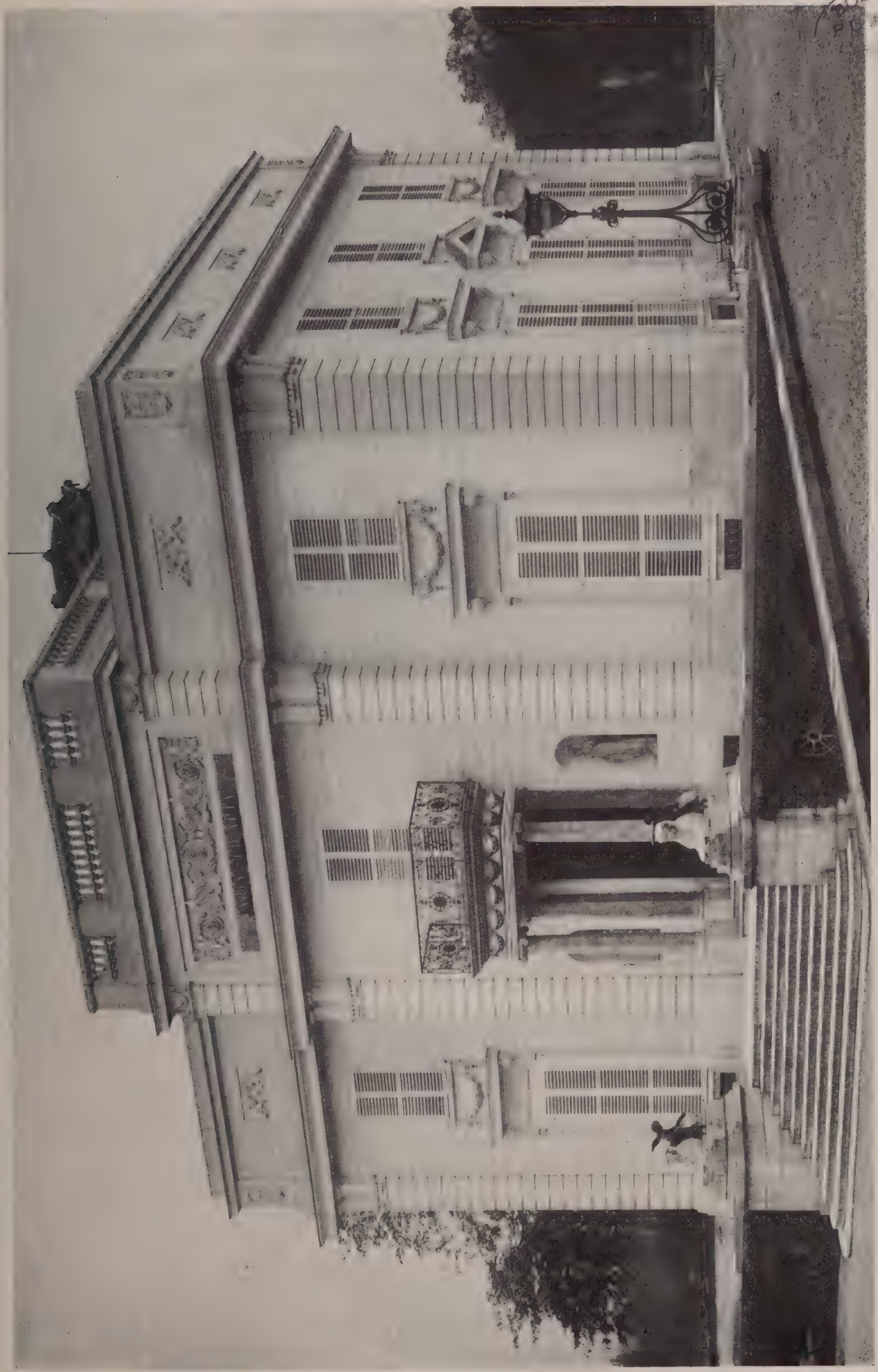
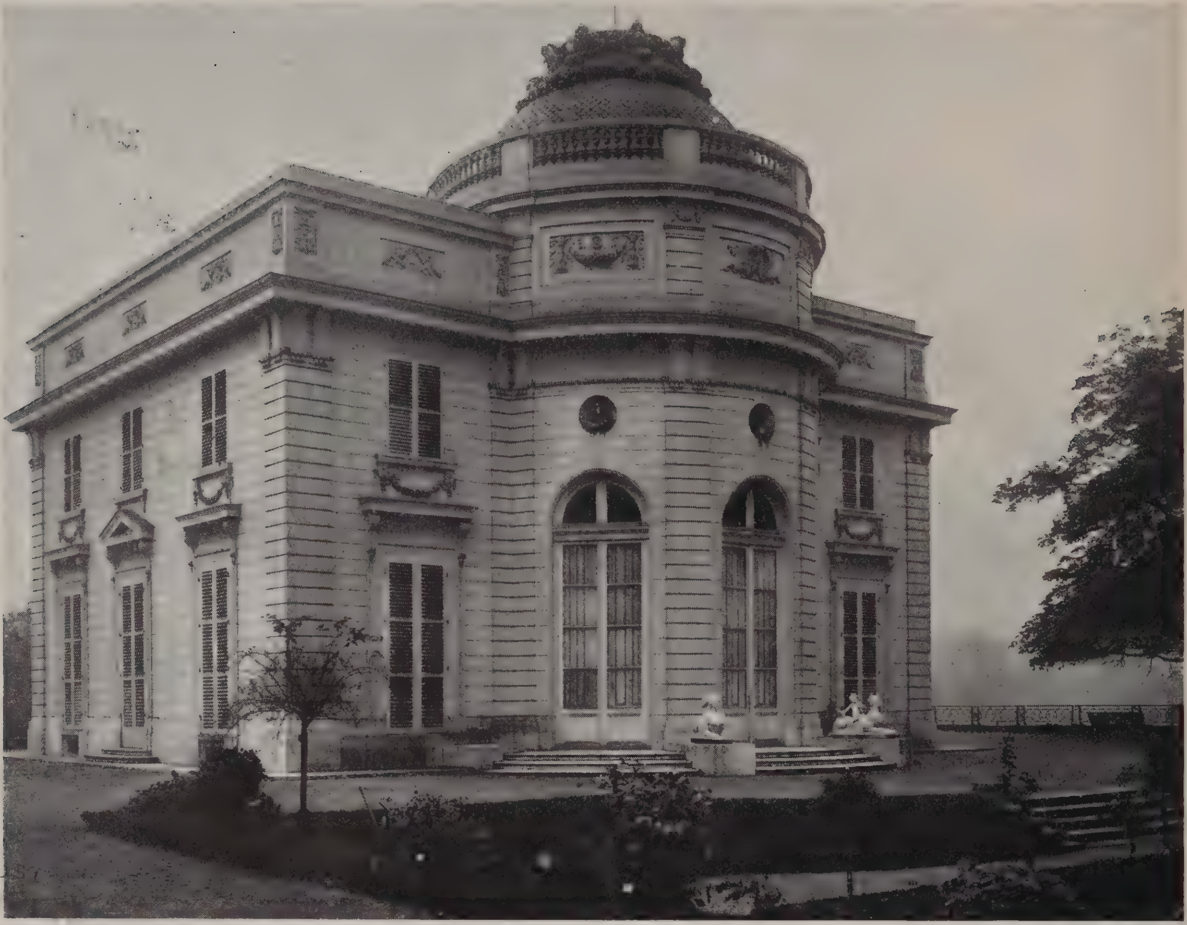


MAIN FACADE, THE BAGATELLE, PARIS

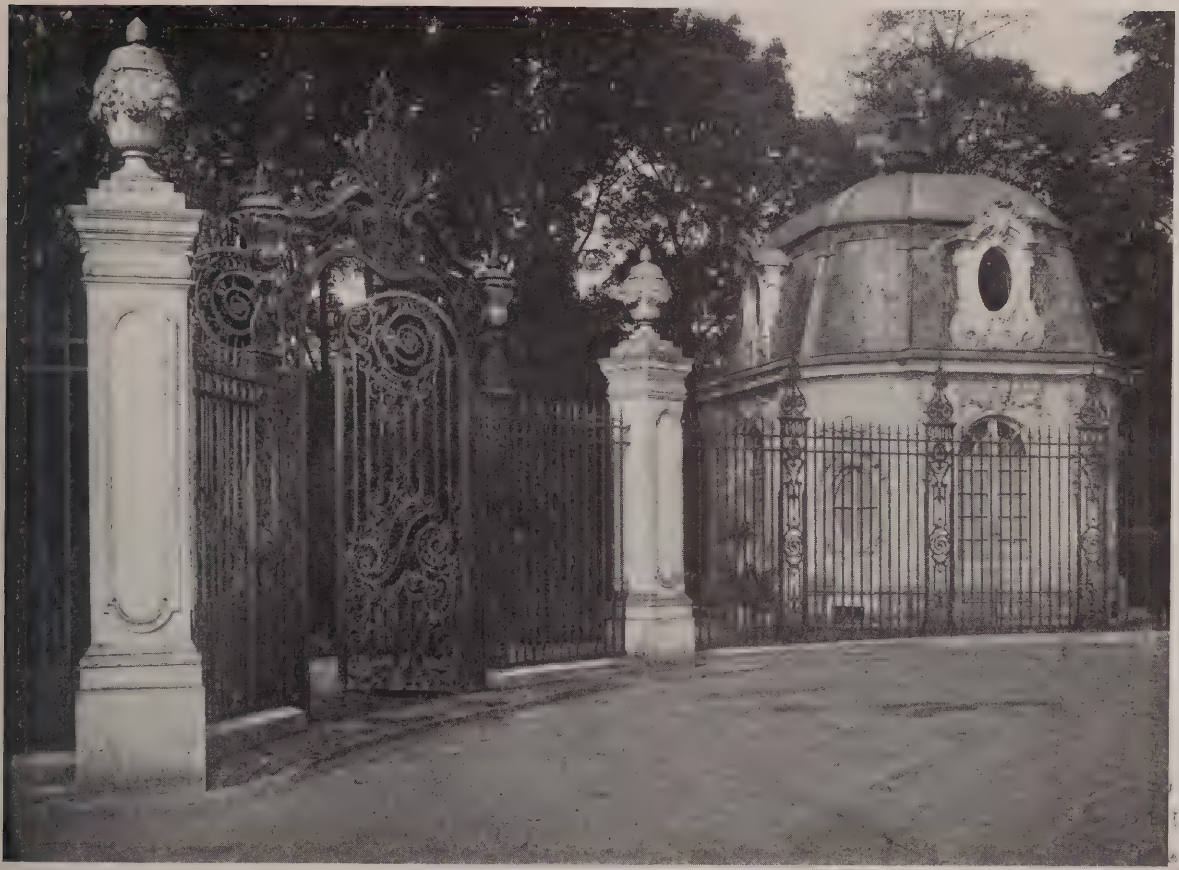
F. J. BELANGER, ARCHITECT



East Facade of the Bagatelle

of the queen until May, 1778. On the 23rd of that month the Comte d'Artois offered the Queen Marie Antoinette a fete, "Rose and Colas," an opera-comique by Sedaine to be given in the gardens of the *Bagatelle*. Members of the court took part, and the queen herself impersonated a lady's maid. At one point in the progress of the piece, when there was a slight hesitation at the end of a speech by the queen, a whistle was heard. The queen, glancing toward the king, and recognizing him as the disturber, advanced to the edge of the stage, addressing him thus: "Monsieur, since you do not approve of my acting, will you not have the kindness to depart? They will give you back your money at the gate." The king, the chronicles read, was ashamed of himself, and demanded her pardon.

The Revolution struck the *Bagatelle* like a cyclone, as it so cruelly did to so much that was lovely in France. The statues were broken, the paintings and friezes were defaced, the gardens trampled upon. The methods of the Comte d'Artois, flown to Turin to save his own skin, had had too much publicity. His *folie* was not allowed to escape. Soldiers camped on the grounds, rare plants were dug up and removed, and the estate was decreed by the convention to be a public playground, a *place pour les jouissances du peuple*. The château itself by 1806 had degenerated into a mediocre cabaret. In June of the same year, however, the Emperor Napoleon, installing law and order in his triumphant wake, bought the *Bagatelle* for 321,206 francs, "which includes the mirrors and the chandeliers." Napoleon made many necessary repairs, filled the forest with game and deer, and in the next few years dined there often or attended the carefully selected receptions which the Empress Josephine, assisted by her friend Tallien, loved to arrange. With the banishment of Josephine, and the arrival of Marie Louise and the little *Roi de Rome*, the *Bagatelle* became almost a "royal" nursery. The adored child was taken daily to the gardens for his airings, and when he was old enough to walk, he promenaded the length of the court between rows of guards who stood at rigid attention while he pattered innocently by. There too it was, in one of the tiny boudoirs adjoining the central circular salon, that the affecting first meeting between the ex-Empress Josephine and the little *roi* took place. Napoleon and Marie-Louise could fear no evil from one who had loved

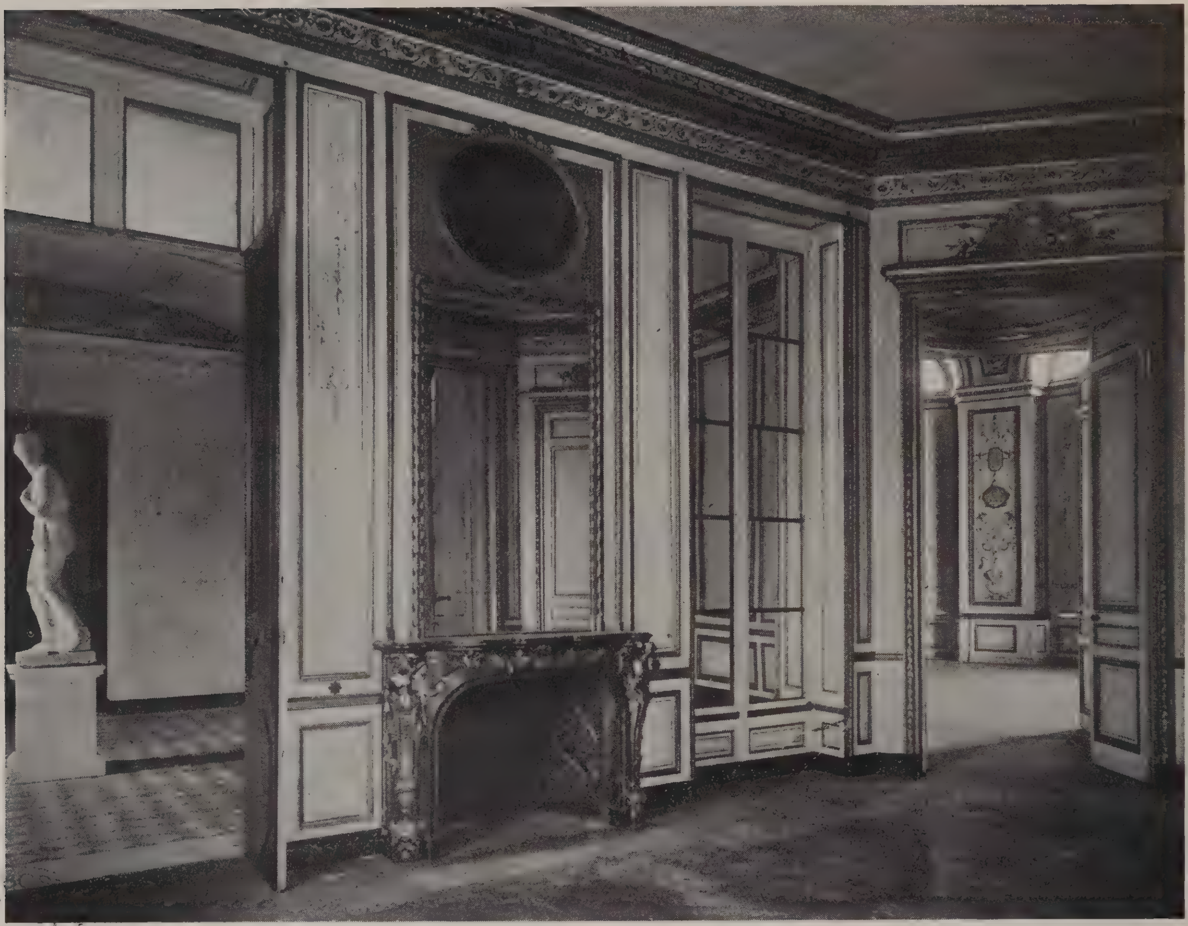


Gate of Honor and Entrance Pavilion, the Bagatelle

and suffered as had Josephine. They granted her request to see this baby of 19 months, of whom she herself in the days when she was Napoleon's wife had so prayed to be the mother. So the meeting was arranged to take place at the *Bagatelle*. The records say that she entered, "all trembling with emotion," and kneeling before the imperial infant, who lay across the knees of the Comtesse de Montesquieu, his governess, "tenderly and longingly kissed his tiny hands and golden curls, then rushed from the room in sobs."

At the return of the Bourbons, the *Bagatelle* was given to the Duc de Berry, in whose hands it became a hunting lodge popular among the courtiers of the restoration. A card still exists inviting a guest to hunt: "Monsieur the Duke of Berry will hunt the fallow-deer in the Bois de Boulogne the tenth of this month. M........ is invited by His Royal Highness to present himself at the *Bagatelle* and partake of refreshments after the hunt. Signed, Comte de Nantouillet. (The breakfast will be at ten hours and a half.)"

In 1835 the *Bagatelle* came into the possession of a rich Englishman, Richard Seymour, the Marquis of Hertford, who in the years that followed restored it, not into its original form, which was literally impossible, but into a gracious and beautiful dwelling place. Augustin and the brothers Adam were brought in to decorate the boudoir panels, of which the original paintings had been executed by Dussaulx and Dugourre. The rooms were embellished with pictures, vases, and objects of rare workmanship; 150,000 square metres were added to the property, the *orangerie* was built, and all was in perfect order when the first important visitor, Queen Victoria, arrived. The art collection eventually became so vast that when, on the death of his illustrious father, Lord Wallace received the *Bagatelle* as part of his inheritance, he found it necessary to construct the little museum at the right of the court to contain it. Again the circular salon, the tiny boudoirs, the dining room and the billiard room were restored to their shining gold and white simplicity. Lord Wallace's decorators removed all art works of inappropriate periods, and when after his death the French government bought the *Bagatelle,* it acquired as perfect an example of the style of the period of Louis XVI as is to be found in France. The swags, the wreaths, the designs in general have that tendency toward the purer Italian Renaissance forms which is found throughout France in the work of this period. Only in the fireplaces, charming in design and symbolism as they are, do we feel some lingerings of the Baroque and the heavier style of the period



P IC ARY

The Grand Salon of the Bagatelle

just over. The handles and the hinges of gilt bronze are all delicate and true to the time, as are also the checker-board marble floors, the hanging staircase, and the white and gold panels picked out in color. The stone sphinxes that guard the doors are charming reminders of the eighteenth century. Their lions' flanks are draped with elaborate covers, and their women's heads are adorned with what appear to be curled and powdered wigs. On their backs alight, for an instant it seems, puzzled and decorative cupids whose hands caress the anomalies beneath them.

In the formal garden, too, are small cupids astride high leaden jars. Impudently, chin in hand, they stare across their vases at each other. The garden's oblong space is edged with rows of flowers. Pink, red and white geraniums mingle in charming complexity. The little standard rose trees that rise from the central beds open red, magenta, or yellow petals to the August sun. It is indifferent to the gardeners of the *Bagatelle* what colors may blend or not blend. The effect is riotous, elegant, charming, in fact exactly the note to have been struck in an eighteenth century garden. The colors from the lily pond beyond are gorgeous also. Across the pool there is a stone grotto where water drips from cool, mysterious little crevices, while in the foreground are all the varieties of water lilies. Exotic and colorful, they line the edge. Even the labels giving their names, a legacy from the naturalist, Monsieur Gravereau, who made the gardens of the *Bagatelle* after the government acquired them into a veritable floral fairy land, are inspiring: *Somptosa, Virginalis, Vesuve, Hermine, Superbe.*

The gate lodge clock clangs a leaden double note. Sixteen hours. The good *bourgeois* droop in their seats. The children watch the gold fish which alternately loiter and dart about the garden pool. Shadows crawl across the lawn. The tiny round pavilion, whose latticed arches are filled with glass, catches some glints of the falling sun. It is just large enough to accommodate a tea table for two. How Count Fersen, who died to save her pretty head, would have loved to sit here and pour the tea in his queen's exquisite cup! The *fleur-de-lis,* the crown, the initials of the queen would all have been on that cup, made in Sevres, perhaps, a half-mile down the river. How the lackeys and the waiting maids must have rushed to unpack the queen's boxes! The coach, rattling into the court, waiting while out they tumbled.

F. a.

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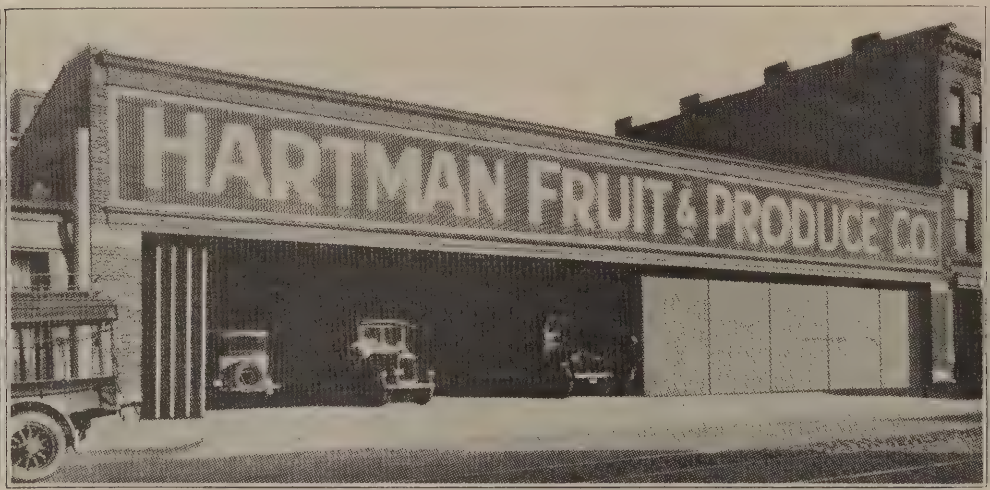

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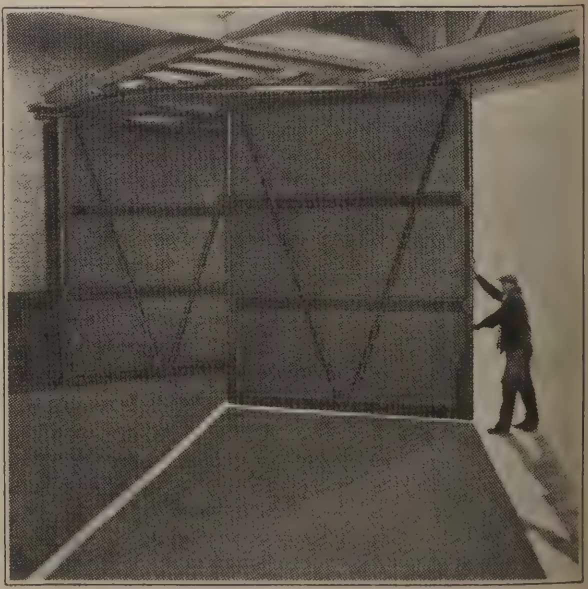

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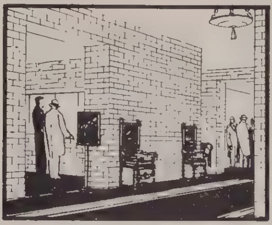

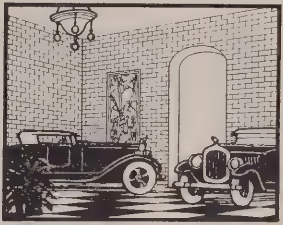

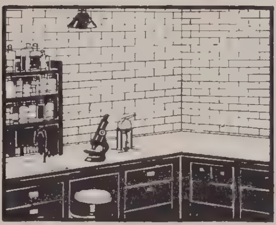

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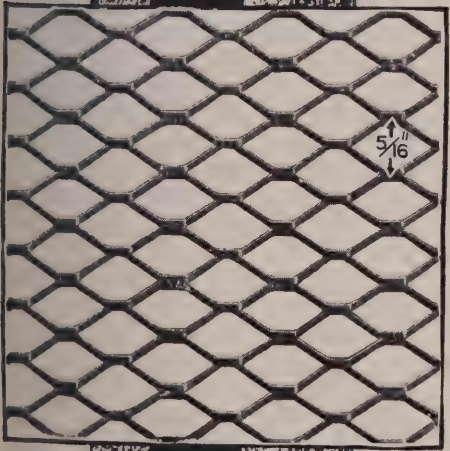

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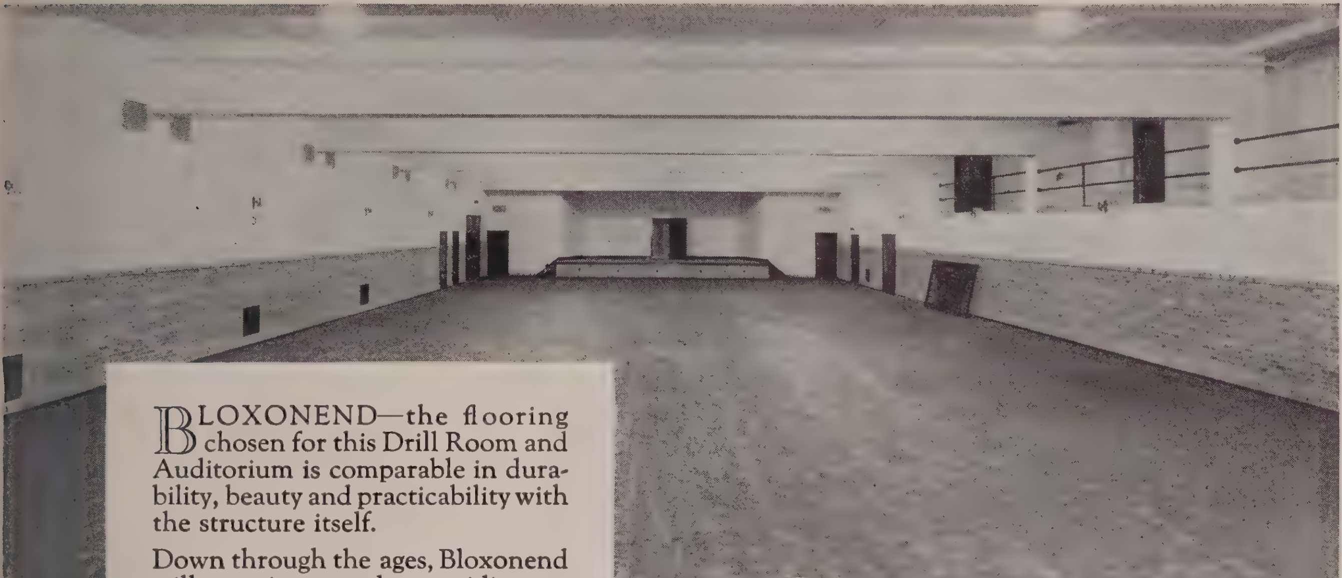

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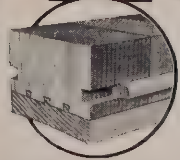
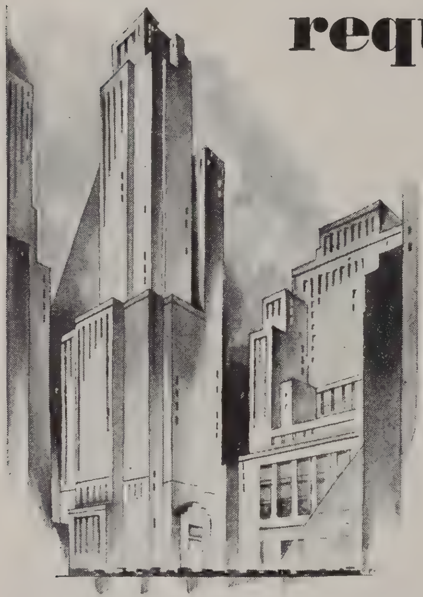


Lays Smooth Stays Smooth

Modern Buildings require Centralized RADIO EQUIPMENT



IN planning new apartment houses, hotels and other multiple residence buildings, provision for proper radio reception is becoming a necessity. New buildings not equipped in the beginning with adequate radio facilities will soon have to be rewired at a greater expense.

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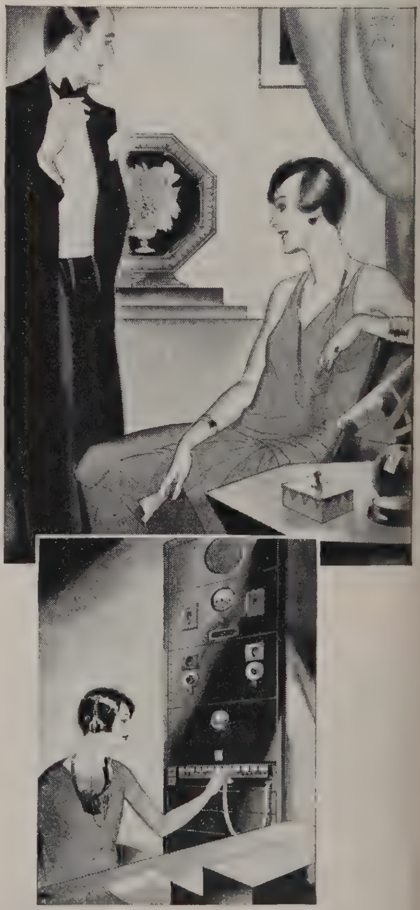

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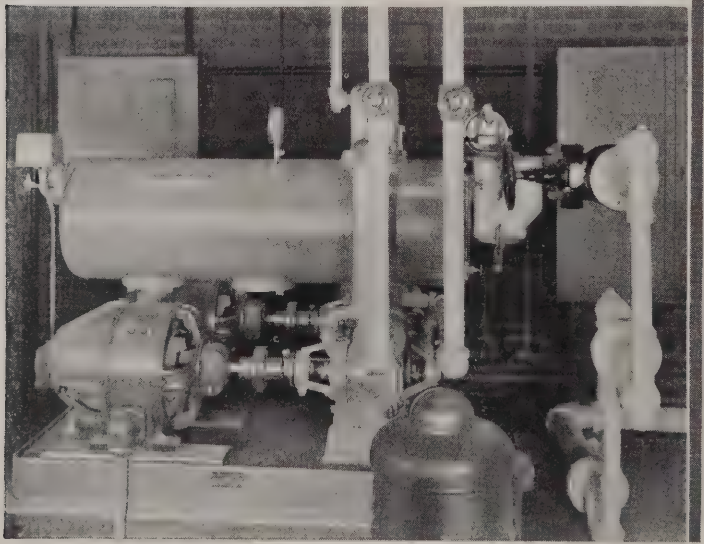

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BOOK DEPARTMENT

THE PRACTICE OF THE DRAFTING ROOM DESCRIBED

A REVIEW BY
CLIFFORD WAYNE SPENCER

THE operations that take place in that part of an architect's premises known as the drafting room are so diversified under the conditions of modern building that the subject of drafting room practice is worthy of much consideration. If one were to attempt to become familiar with all these operations by means of experience gained through working in one organization after another, it would require a lifetime of going about from office to office, and even then much of the knowledge would be out of date, due to use of new methods and to the improved practices which are being introduced.

An excellent textbook and guide on the subject has been compiled by Eugene Clute, former editor of *The Architectural Review* and later of *Pencil Points,* and author of several works on architectural subjects. This book is dedicated to effectiveness in drafting room work and presents a clear and comprehensive view of present-day drafting room practice as it is carried on in the offices of some of the most successful architects of the day. The term "drafting room" is here used in its broader sense and is made to refer to many operations that are not ordinarily carried on within the physical confines of the drafting room itself. These processes which commonly occur outside but which are here said to come into the work of the drafting room include the making of rough preliminary sketches and *partis* as well as the ascertaining of the governing conditions under which the work is to be done. The text matter in this work is comprehensive and describes in clear, concise terms the various problems that may arise in connection with drafting room practice and the best methods of solving them. This text discussion is made immensely more valuable by the use of illustrations chosen from the best examples of the practical work of many of our best designers, renderers and other workmen,—the type of work for which they are best known.

Although each chapter is treated as a unit complete in itself and may be read and easily understood without reference to the rest of the book, the whole is organized along the lines on which a particular commission would naturally be carried out, from the earliest to the final stage of the work. The methods of procedure and the best ways of ascertaining the requirements and governing factors are first considered, including some hints on

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The editors have been assisted in the preparation of the work by widely known hotel architects and interior decorators and by actual operators of hotels,—practical men, experienced in the management of the "back" as well as the "front" of a hotel. The volume's treatment of hotel furnishing and equipping constitutes the final word on this important subject. There are included views of hotel restaurants, cafeterias, kitchens, pantries, "serving pantries," refrigerating plants and all the departments which are necessary in a modern hotel of any type. *The work is of inestimable value to architects, builders and engineers, as well as to practical hotel men.*

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a most important subject,—that having to do with the financing of the building and doing the work in such a way as to satisfy the requirements of those who will furnish the financial backing. Next we turn to the design features of modern building and consider the preliminary steps, such as the use of documents and the making of sketches and preliminary studies. These chapters are of especial interest, due to the way in which they are illustrated by the work of such men as Otto R. Eggers and Charles Z. Klauder, as well as by some very striking charcoal studies by Schell Lewis. Recently there has been a great increase in the use of scale models as a means of studying the design of a building and submitting it in an easily understood form for the approval of the owner. This being such an important and little understood subject, a comparatively large amount of space is devoted to describing the actual making of such models and their use. One interesting use of these models, which is described and illustrated here, is the use of "composite photographs" made up of photographs of models of proposed buildings so cleverly combined with photographs of the actual site and surroundings that it is impossible to tell which are the present buildings and which are the models. Full-sized models of detail study are also discussed in this chapter on the making and use of models. The chapter on rendered drawings is very complete, especially in illustrations, which include examples in all mediums by such masters as Bertram Grosvenor Goodhue, H. Van Buren Magonigle, Otto R. Eggers, Hugh Ferris and many others.

The subject of draftsmanship by its very nature can be better presented by illustration than by text, and in this work it is so treated, there being a large number of full-page reproductions of well chosen examples of all classes of drawings that make up the working drawings of a building project. They include all the variations, starting with the preliminary plans and going through to the full-sized detail drawings. The text description, though comparatively brief, brings out some very interesting life studies by H. Fenner Behmer and George Bellows and adds considerably to the volume's value.

Another important subject to be considered by the architect in many instances is that of planning the surrounding planting and landscaping. Although this is often handled by the landscape architect, the architect himself should be familiar with this sort of work in order that he may be competent to coöperate in the matter. The chapter entitled "Topographical Maps" does not confine itself to maps exclusively, but treats of other phases of landscaping as well. The final chapter on "Drafting Room Records" covers a subject of very definite importance to the profitable and efficient operation of an architectural organization. It presents the printed forms that are used in the offices of leading architects, giving many useful suggestions on the proper handling and filing of drawings, and the keeping of necessary records relating to drawings, revisions, issuing of prints, and the time records of the drafting room. To one who is not familiar with the usual procedure in drafting rooms this book will be invaluable, while to the more experienced members of the profession it will serve as a useful and dependable source of information and reference.

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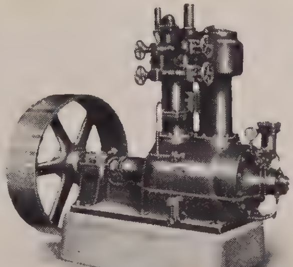

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STYLES OF ORNAMENT. By Alexander Speltz. Translated by David O'Conor. 647 pp., 6 x 9 ins. Price $6. Regan Publishing Corporation, Chicago.

ARCHITECTURE and decoration, as well as manufacturing in countless forms, are dependent upon design to a much greater extent than is generally realized. For this reason there exist many schools of design wherein students are trained to exert their skill in designing not only ornament to be used in connection with architecture and interior decoration but likewise for the use of the weavers of textiles of every sort, for the carvers of wood, the workers of metal in countless forms, for the makers of jewelry and workers in other fields; and there exists what might be regarded as an entirely separate department of the subject as it applies to costume. Wholly apart from the training given in classrooms there are, for the help of students, the masterpieces of the past, for even today after all the wars and other catastrophes which have afflicted the world, there are the records, vast in extent, of what the designers of every age actually wrought. Added to the not inconsiderable remains of what still exists from prehistoric ages, there is the great wealth which was bequeathed to later ages by the classical countries,—Greece and Rome,—and the legacy from later periods becomes bewildering, since every race developed design in ways differing greatly from those which characterized the design of other races. To examine in person even a tiny portion of this rich store,—and notwithstanding the great help afforded by the collections in museums,—would require traveling for years over the greater part of the inhabited globe, and the student must perforce rely for aid upon design available in illustration. For this reason the scholars who study design and who publish works dealing with the subject deserve well at the hands of students present and future.

In his preface to this excellent work, R. Phene Spiers says: "The first German edition of this work was published in 1904 and met with such signal success that its author, Herr Alexander Speltz, was called upon to bring out a second edition two years later. In this edition the number of plates was increased from three to four hundred, which enabled the author to give a more complete representation of ornament as developed in England and America than had been at first contemplated. The original work was undertaken with the object of representing the entire range of ornament in all its different styles from prehistoric times till the middle of the nineteenth century and to illustrate the different uses to which it had been applied. The whole of the illustrations, which were taken from the best authorities on each subject and period, were drawn specially for the work and evince the remarkable industry and knowledge of the author and his artistic power in representing ornament. In fact it is only necessary to glance through the several plates to see how closely the author has caught the style and character of each period. Acknowledgments of the sources are made throughout the work, and in addition a special list of books of reference, including those which have been drawn upon for illustrations, has been inserted at the end of the volume.

"An English edition was published in America in 1906 for sale in that country only, but the historical accounts were not in accordance with the latest research, and many of the descriptions to the plates had suffered so much in translation that very considerable revision was neces-

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sary in preparing the present issue. Three new plates of English Ornament have been added to this edition, taking the place of others which it was found necessary to delete. Various changes have also been made in the headings to some of the chapters and in the terms employed, more particularly in the section devoted to the Renaissance period; for instance, the term 'Barocco,' which, although well known and recognized throughout Germany, is but seldom used here, has been replaced by 'Later Renaissance' which is more familiar to the English student and includes that which used to be known as the pure Italian style introduced by Inigo Jones. The term 'Rococo' has been retained, as it would have been difficult to find any other to suggest the vagaries of the Louis XV style which spread through Italy, France, Spain, Germany and Flanders, and in England led to Chippendale's work; the terms adopted to distinguish the later periods are adhered to as in the original edition.

"The 400 plates in which the several styles of ornament are illustrated contain a larger and much more varied series than in any work hitherto published; indeed the volume forms a veritable encyclopædia of the evolution, development and application of ornament in architecture and the decorative arts throughout the ages, and it should prove of great value to the architect, craftsman, designer and student." The work bears every mark of thoughtful selection and careful editing, and the illustrations, which because of their great number are necessarily of small or at most of moderate size, are sufficiently large to be of value. The volume seems to be destined for a wide circulation among architects and interior decorators and students in many lines of effort.

THE PERIOD FURNITURE HANDBOOK. By Mr. and Mrs. G. Glen Gould. 271 pp. 5 x 7¼ ins. Price $3. Dodd, Mead & Co.

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This is a volume which, because of its low cost and the comprehensiveness of its subject, will undoubtedly have wide circulation. It should be noted that it is not a heavily or in any sense a thoroughly illustrated work. There are some excellent full-page half-tones, casually selected apparently, and numerous marginal notes in the form of line drawings by George Brettell and Clotilda Embree which the decorator and student will value. Like all the work of these writers the present work bears every mark of careful and discriminating selection. It is a valuable addition to the subject matter on its topic.

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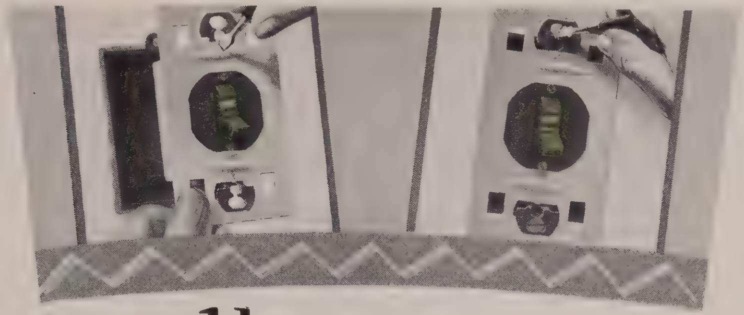

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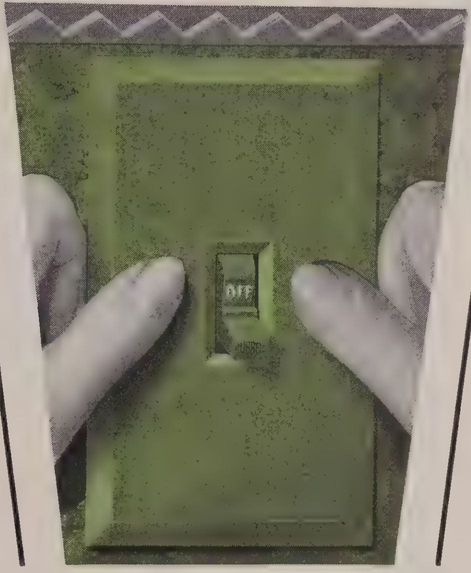

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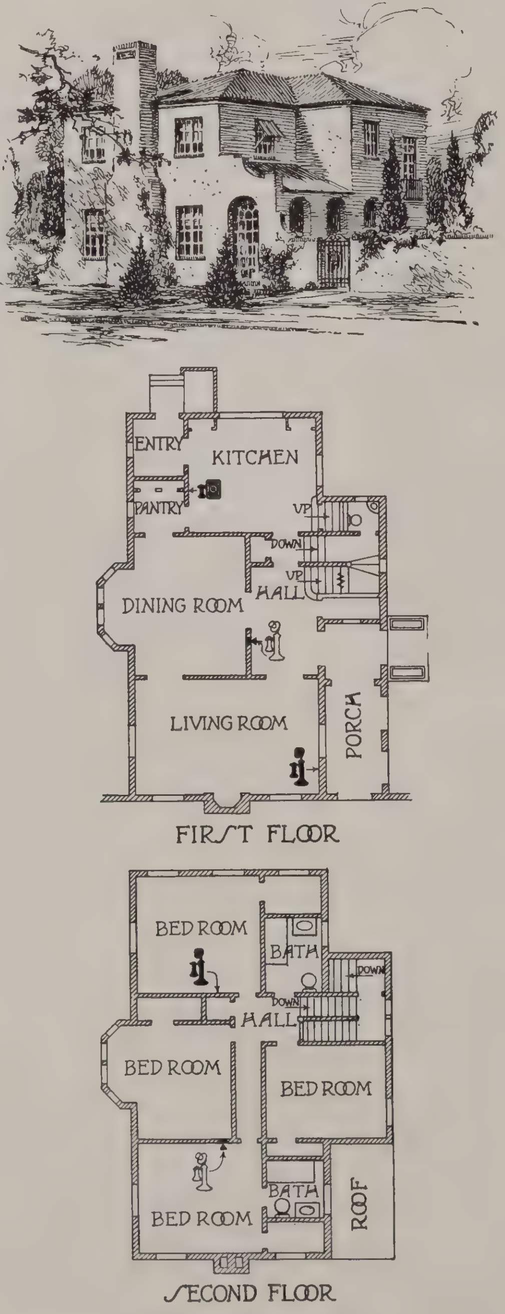

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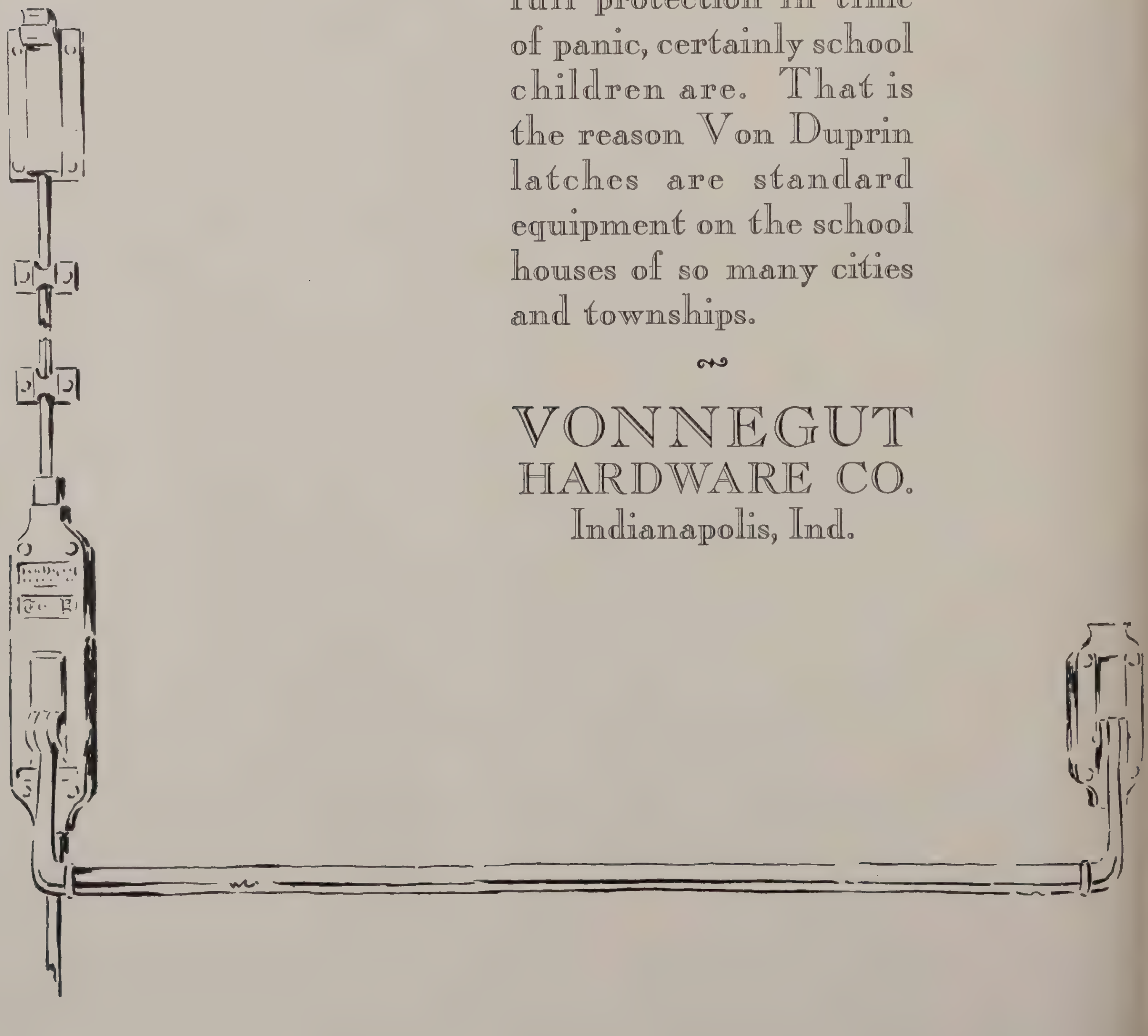

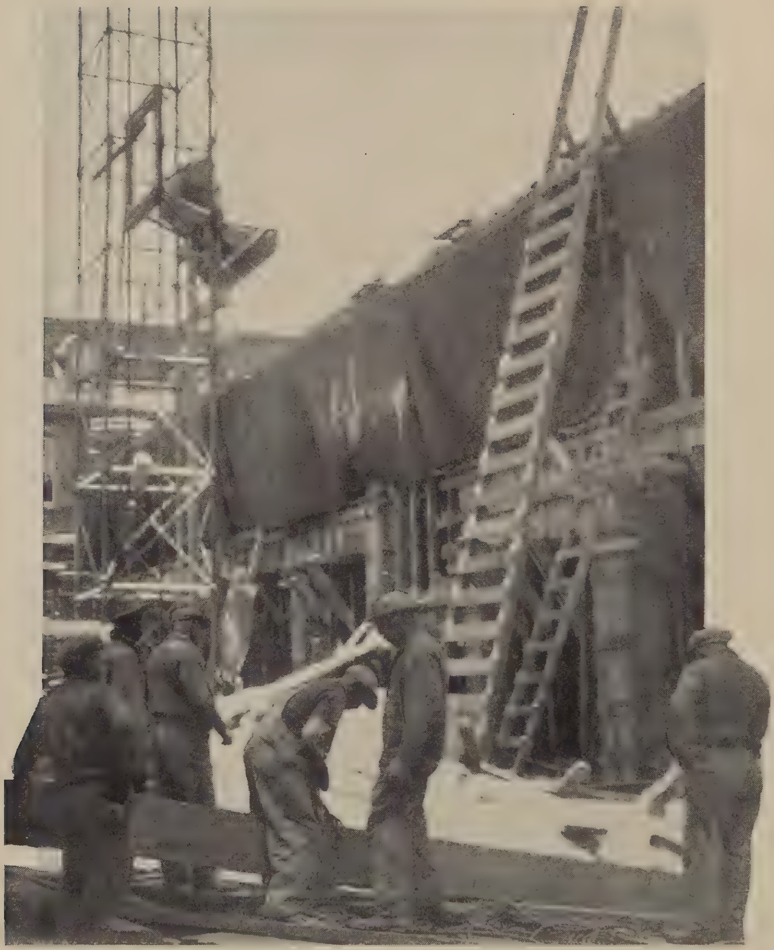

WINTER CONSTRUCTION

From a Photograph by Leicester K. Davis

THE
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FORUM

VOLUME L

FEBRUARY 1929

NUMBER TWO

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THE ARCHITECT'S PART IN WINTER CONSTRUCTION

BY

LEICESTER K. DAVIS

UNTIL within recent years the architectural profession has not had to be greatly concerned with the difficulties of winter construction. In the past such things were mostly handled "on the job," and when beyond control, they commanded the situation until activities might be resumed in accordance with the specifications.

When, for example, a February blizzard howled or "the bottom dropped out of the thermometer," contractors and craftsmen grumbled, did what was reasonably within their powers, or "quit cold." Even though graphs of winter progress produced the peaks and valleys of a typhoid fever chart, hardship and setback were accepted as necessary evils of the season. Laborers, skilled workers, and makers of building supplies alike made the best of prolonged periods of idleness and reduced or glutted output. It was a state of affairs that easily might have continued indefinitely had not the coming of present-day building programs demanded that such limitation cease. Year-round, winter-through, construction suddenly became imperative, with progress to be unhindered by so much as a day's lost time. The problem of beating the weather at its game, of carrying on from fall to spring, has brought forth the best in architectural, engineering and financial thought.

The extent to which he shall play his part in aiding winter construction schedules is something that every architect wishes to have well settled. It may be safely assumed that an architect appreciates the need of being adequately informed and fortified by data concerning all conditions, actual and potential, to be faced in the execution of his designs during the winter period. It is also taken for granted that the facts he obtains shall be complete and authoritative, of the kind prepared for dissemination by building congresses and other coöperative agencies in many of our cities lying within the "frost belt." This material is invaluable for use in preliminary conferences with owners and investors, to support the claims that winter work need not be retarded, and that the extra costs of taking precautionary methods are in most cases more than offset by reductions which contractors figure in their estimates at a time of year when there is risk of having to drop skilled craftsmen from the payrolls and pare down inactive organizations.

Experienced architects do not have to be reminded of the things that may follow on the heels of winter unpreparedness. There are the material faults induced by freezing temperatures, snow, ice and sleet. There is the likelihood of there being work that must come down, or be done over, or be partially replaced. There is the interest that must be charged against spoiling material, and costs chargeable to delayed schedules. And, finally, there is the inevitable result of all these things, strain of the relations between the owner, the architect, and the contractor.

Responsibility in Winter Construction

Causes and their effects are not, however, the sole concern of the architect dealing with winter problems. What he desires most is assurance of there being the proper preventives of winter ills and the effectiveness resulting from their employment. How, he asks, can he and his specifications aid best in keeping the winter program unbroken and at high level . . . how far should he and his specifications go? Logically, the question divides itself into several considerations. Theoretically at least, architectural specifications must be complete in their coverage of materials, means, methods, and results. The specifications are most emphatic as to results and the standards by which they are to be judged. But as to exactness in method and procedure, it has been held that such are without the province of strict architectural

Winter Equipment on this Construction Includes Pre-warming Stations. Material is Sifted by Gravity over Perforated Steam Coils which Give it Correct Temperature Before Going to the Mixers

preference and requirement, things with which experienced contractors, and they alone, should deal. And it is this viewpoint, as regards precautionary methods for winter work, that the architect is considering while plotting his position.

Investigation indicates that there is pretty general agreement between architects and contractors on essential points. Summed up they seem to be:

First: All specifications should include clauses obligating employment of the newest and most approved methods designed to insure correct performance under winter conditions surrounding particular phases of work in hand. Even though the construction schedule be planned to avoid winter work, this is a most advisable provision. Any one of several unforeseen delays may carry completion dates into the winter season, a possibility which, no matter how remote, should be prepared for in an adequate manner.

Second: Only contractors of known ability in handling work of the type required by the design should be considered as bidders.

Third: There should be a thorough understanding on the part of the architect or his representative of all problems likely to be encountered by winter construction within the locality where erection is to take place, as well as of methods best

Anti-freezing Compounds and Adequate Cold Weather Precautions Required by the Specifications Permit the Maintenance of High Standards of Craftsmanship and Unchecked Progress suited to local conditions in meeting the problems.

Fourth: There should be thorough and frequent architectural contacts with all stages of winter construction.

Fifth: There should be complete coördination, particularly on large-sized projects, between the architect or his representative and the contractor, in handling unforeseen exigencies.

Sixth: Separate contractual provisions should be attached to, or made a part of, the general contract, permitting immediate use of whatever temporary or auxiliary apparatus and material may be necessary for the control of winter emergencies.

Seventh: Sub-contractors should be informed as to winter conditions likely to be encountered, in order to provide safeguards and figure them within their estimates.

Eighth: Progress reports and conferences should be made requirements of the specifications by special clauses describing their purpose, at what stages of the work they shall be submitted or held, and the type of information they shall present for discussion, approval, or criticism.

Ninth: There should be effective use of established and current data available through building congresses, associations, and other reliable agencies which act as clearing houses of informa-

Tarpaulin Coverage for Openings and for Freshly Poured Concrete Wall and Floor Forms is Essential Until the "Set of the Mix" Has Passed all Danger from Freezing Temperatures

Behind Tarpaulin Barricades with Correct Temperature Maintained by Salamanders and Emergency Steam Lines, the Workers Inside Carry on Unretarded by Cold or Snow

December Construction Scheduled for May Completion. Material Pre-warming Station, with Form-builders Keeping Ahead of the Mixers. At extreme Right Tarpaulins are Going up on Freshly Poured Forms

tion dealing with specific phases of winter construction under local conditions.

This list would seem to run the gamut of factors essential to successful construction at any time of year, but particularly so during the cold weather portion. Perhaps the architectural profession might amplify it to a set of rules for embodiment in all specifications for construction that must go on through the winter.

Specification Clauses for Winter Work

Regarding actual specification clauses covering methods to be employed on winter work, most architects feel that there should be avoidance of the "ultra-specific." They reason, and quite justly, that these as well as other phases of construction should be capably cared for by any reliable contractor.

A "blanket clause" suggested by Lawrence Visscher Boyd, who has designed for suburban developments in the East many homes that have gone forward to completion during trying winter periods, has worked out satisfactorily. This clause, under the heading, "Winter Work," reads in part: "The contractor shall include in his estimate all facilities, such as appliances, known standard waterproofing, anti-freezing compounds and similar materials, as well as the employment of the latest and most approved methods and means for combating the effects of cold and other winter conditions, which if not provided nor utilized, would impede the progress of craftsmanship essential to the results stipulated by the provisions of these specifications in whole or in part."

Winter conditions are covered in much the same manner by the Ballinger Company, architects and engineers, of Philadelphia. Under the heading, "Freezing Weather," the specifications read: "Materials used in concrete, brick or stone masonry, plastering or other work subject to freezing, shall be properly heated by approved methods when the temperature is below 33° Fahr. Any work damaged by freezing shall be torn out and replaced at the contractor's expense, and new work shall not be placed in contact with such damaged portions. The proper precautions shall be taken, however, to enable the work to proceed without interruption, if possible." Further, under the heading, "Temporary Heat," the specifications read: "The building contractor shall provide all temporary heat and make all other provision, such as temporary covering for door, window and other openings, which may be required for the performance, completion and protection of his work against cold until the building is completed, all subject to the approval of the architects."

Stating more definitely the precautions which must be observed in the handling of materials

Laborers "Mopping Up" an Overnight Snow Before the Day's Work Starts. Lines of Steam and Shovel and Broom Soon Clear Away an Otherwise Unworkable Area

most likely to be affected by winter temperatures, the body of the same specifications contains a clause headed "Cold Weather," which thus refers to concrete: "Reinforced concrete shall not be laid when the temperature is below 33° Fahr., unless special permission is obtained from the architects. In such cases the concrete ingredients shall be properly heated by suitable means immediately before being mixed. Should the temperature drop below freezing or when the U. S. Weather Bureau predicts such weather, fresh concrete shall be protected above and salamanders or other heat provided below. Canvas shall be placed some distance above the slabs and temporary openings be provided through slabs to allow the heat to circulate. Canvas curtains shall also be hung around the outside of the story concreted to retain the heat, and the temperature of the concrete must be kept above 40° for five days after concreting. Concrete that becomes frozen while fresh, and found to be injured, if it cannot be reclaimed by additional water or otherwise, shall be removed at the contractor's expense. Forms shall be left in place during cold weather until the concrete has obtained a hard, natural set."

So far as the specifications go, the matter of winter protection appears to be adequately settled by clauses such as those just quoted. They definitely require ample protection, and while concentrating responsibility where it properly belongs, they leave the contractor free to exercise his judgment, skill and ingenuity. It would be neither fair nor wise for the architect to establish inflexible rules and methods whereby the materials must be kept at correct working temperature or temperature maintained for all kinds of interior work. The contractor of standing is quite alive to the necessity of progressing with speed and efficiency, and is usually fully informed as to the best methods to fall back upon in any cold weather emergency. He does appreciate, however, the coöperation of the architect on these matters when it is given from a thoroughly practical and structural point of view.

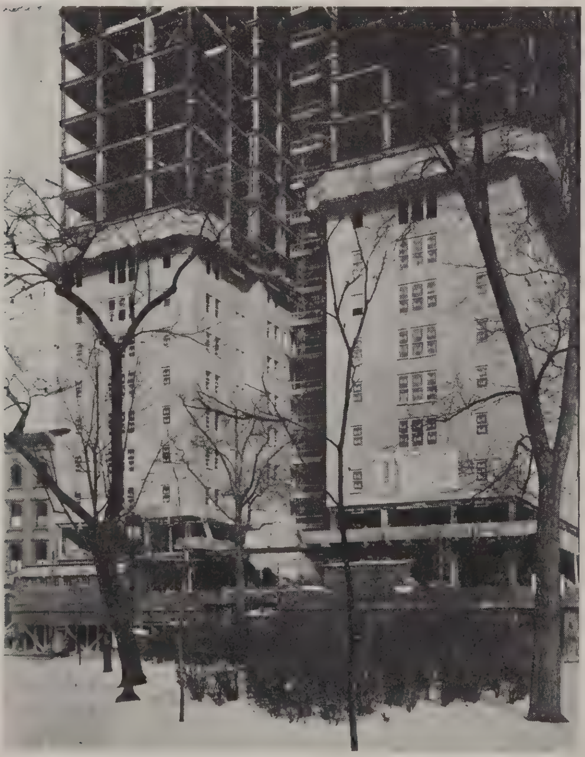
Costs of Winter Construction

Provisions for extra winter costs and their distribution should be discussed frankly and completely, and be settled to the satisfaction of all concerned by agreement, before the need for expenditure arises. Architects whose practice is carried on in cold-weather latitudes know how great are the variables in additions and offsets of this character. It would require supernatural skill to incorporate them in an estimate on the basis of accurate forecasts, but an average can be struck that permits a safe approximate to be figured for contingencies.

It would seem best that this should be cared for by separate contractual instruments or clauses of the contract, so worded that the contractor may feel free to exercise his discretion in the utilization of ways and means required by unforeseen conditions. No matter how great may be his reliance on a contractor, the present-day architect is coming more and more to realize the importance of thorough familiarity upon his part with those details of construction that are most affected by winter influence. While not attempting to enter too far within the sphere of purely structural activities, he has found it well to be more than passingly conversant with the solution of numerous winter problems. Increasing understanding of these things is contributing the coöperation and coördination which few contractors and their crafts fail to appreciate.

Supervision of Winter Construction

Architectural field activities in the year-round building of today call for more than checking the details of design or superintendence that merely sees that the specifications are adhered to. Whether the plans require only occasional visits to the scene of operations, or are those for which the construction superintendent's office also becomes an architectural field headquarters with a clerk-of-the-works or architectural supervisor following the progress of workers in a score of complicated crafts, the viewpoint of the architect should be closely akin to that of the men who produce the finished structure.



Simple Forms of Temperature Control Suffice for Open Steel Work. Tarpaulins and Scaffold Salamanders Protect and Warm Exterior Bricklayers, but Inside there Must be Steam Lines and Portable Radiators for Plastering, Tile and Marble Setting, and Other Types of Interior Work

But a few days before this article was written, I visited an enormous piece of winter erection which by this May will probably be housing the equipment and personnel of a nationally known concern whose factory capacity and area must keep pace with tremendously increasing production. Stretching away on all sides, over acres and acres which a couple of months before were without a trace of building, and already at second-floor level, was developing one of the great architectural-structural creations of the present century. I was taken on a tour of inspection by the supervisor detailed to the work and the superintendent of the firm of contractors constructing this enduring expression of masterful design. Behind them I went into every part of that unbelievably complex thing of rivet-spatting steel and snarling concrete mixers sending slushing cargoes to millions of feet of wall and floor and column forms. I watched hundreds of men, division upon division of craftsmen and laborers, working in perfect coördination and control,—carpenters, bricklayers, masons, equipment men, drivers of an unending stream of motor trucks delivering the tonnage upon which this giant fed and was growing so swiftly to maturity.

Progress,—unbroken, hitch-free, smoothly flowing construction everywhere! Above us, to the right, the left, and below, great tarpaulins flapped and strained across openings and surfaces which could be affected by the biting winter wind. Strategically placed salamanders glowed from within. Clouds of steam plumed the boiler sheds from which there radiated a web of temporary lines carrying required temperature control. "Weather Bureau report just in," said the construction superintendent, shoving up the sheepskin collar of his coat, "says it'll be hitting the low spots for a record cold snap,—29 this noon."

Their aides came and went,—assistant division superintendents, field engineers, foremen,—checking in, reporting, taking fresh orders, each with a definite responsibility and part to play. It was inspiring and made me realize just how definitely architecture has got down to brass tacks in standing shoulder to shoulder with the constructors in eliminating winter delays.

By playing a more coöperative part in aiding year-round structural progress, the designer is getting just far enough away from the ordered atmosphere and environment of his drafting room and conference chamber. His is a closer-knit alliance with the active elements of modern building. And, as a result, there are passing the restraint and reserve that have marked the craftsman's attitude toward architectural relations.

PAINT ON CONCRETE SURFACES

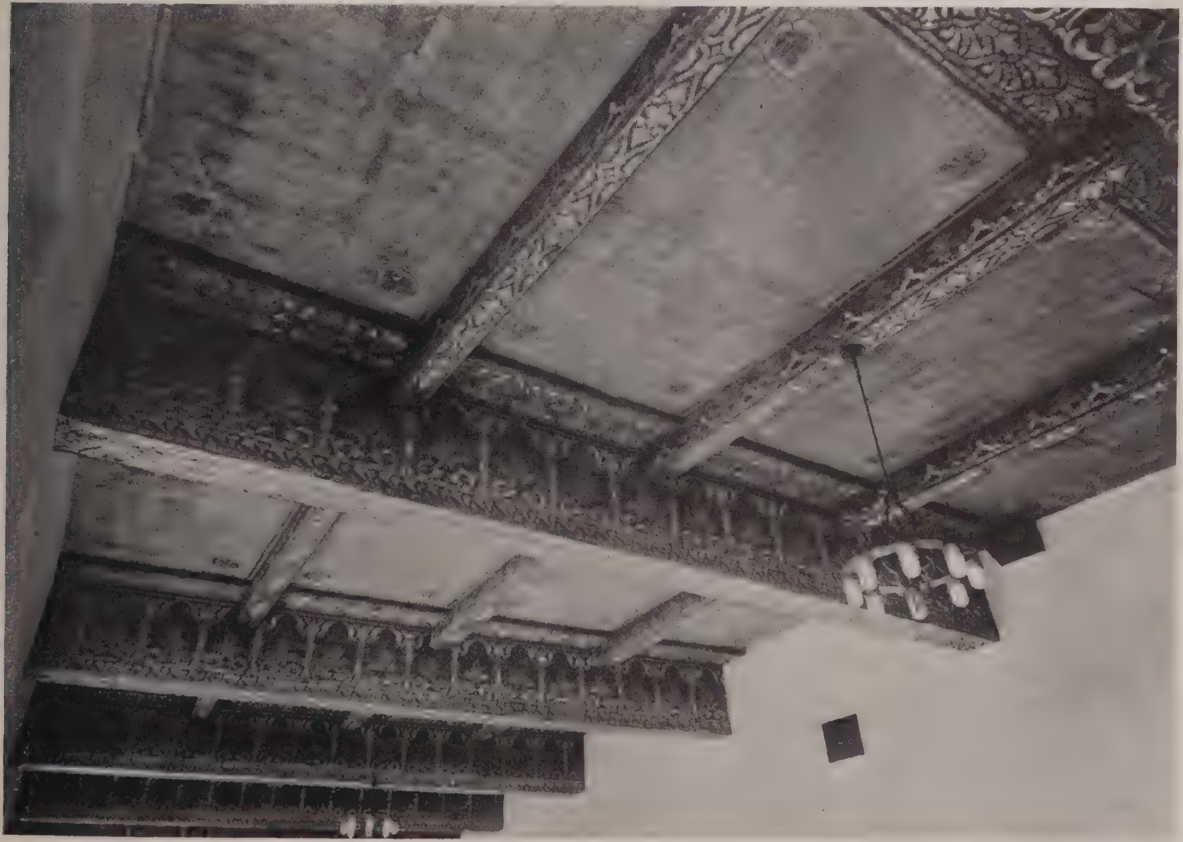
BY

E. L. CALDWELL AND JAMES E. FOSTER

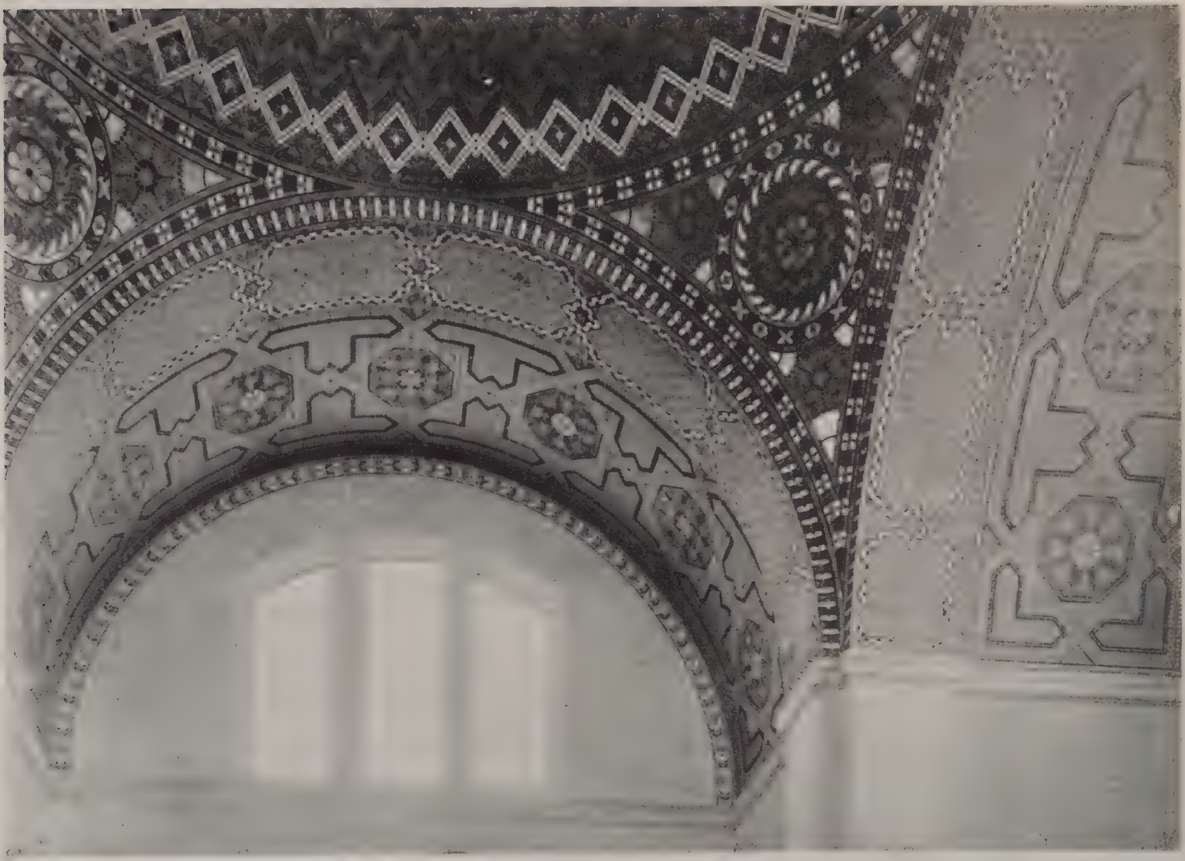
THE present-day tendency in architecture is toward making structure and decoration an organic whole. The modernists insist that there is a certain vigorous beauty in any design that is structurally sound. They point to the beauty of the Brooklyn Bridge, which is, from beginning to end, the work of engineers. While their more conservative colleagues will not follow this reasoning to its logical conclusion, they admit that structure and the decoration can be successfully fused without making a sacrifice of the traditional principles of good architecture. In architecture, at least, the modernist and the fundamentalist can meet on a common ground.

Reinforced concrete construction has adapted itself to this tendency. The reasons are obvious. The structural members require no treatment to make them firesafe. They are in themselves self-sufficient. Why, then, should interior members be covered? The texture of concrete has a distinct rugged beauty. Its somber gray, however, is not in harmony with the present demand for color,—a demand that has extended to alarm clocks, to typewriters, to kitchen ranges, and even to refrigerators. The cry for color is being met by the application of paint and stains to concrete surfaces. This method of treatment has been used under many varying conditions and is definitely past the experimental era. A practical technique for applying paints to such surfaces has been in use for several years, and if it is followed by competent craftsmen, a pleasing and permanent effect will be produced.

Two major classes of paints are used on concrete,—oil and water paints. Oil paints may be further divided into lead and oil paints and cement and oil paints. A lead and oil paint is based upon the principle of grinding a pigment such as white lead in a vehicle such as linseed oil. These two materials,—white lead and linseed oil,—are the bases of most oil paints, irrespective of color. While pigments besides white lead are frequently employed, this material is usually present. In general it may be said that lead and oil paints in-



Detail of Monolithic Concrete Ceiling and Panels Decorated with Paint. The Form Marks Are Distinctly Visible and Form a Part of the Design



Intricate Stenciling has been Used Effectively on the Monolithic Concrete in the Los Angeles Public Library
Bertram Grosvenor Goodhue and Carleton Monroe Winslow, Associated, Architects

clude flat finish paints for interior decoration, mill whites, floor paints, and general purpose paints. Cement and oil paints are made by grinding Portland cement and other pigments in an oil vehicle. The vehicle is usually linseed oil or a mixture of linseed oil with Chinawood oils. White Portland cement is generally used for whites and light shades, and gray Portland cement is employed when the darker shades are produced. These paints dry to a hard, flat finish that may be rough to the touch.

The application of oil paints on concrete should not be started until the entire surface is thoroughly dry. From eight to ten weeks should elapse between the completion of the moist curing period and the painting. This time will ordinarily be taken up by the common cycles of construction. If there is any doubt at the end of this time as to the dryness of the concrete, sprinkle water from a wet brush over different sections of the surface. If this water is readily absorbed, the surface may be considered dry enough to serve as a satisfactory base for the paint. After new cement surfaces have dried sufficiently, a solution consisting of two or three pounds of zinc sulphate crystals mixed in a gallon of water is applied to the entire area. This treatment is used as a precaution against saponification of oil paints on fresh cement surfaces, which injures them.

The zinc sulphate solution is allowed to dry for at least 48 hours. At the end of this period all protruding crystals are brushed off, and the surface is ready for priming. When lead and oil paints are used, the surface is given a binding and suction-killing treatment. This consists of one or more coats of oil or varnish carrying some pigment. This binder can be made to the formula:

Oil paint	4 parts
Chinawood oil spar varnish	2 parts
Oil, turpentine, or some similar thinner	1 part

Chinawood oil is specified because it is more resistant to alkali than is linseed oil. Several manufacturers market special Chinawood oil priming paints for use on concrete.

This treatment is to kill the suction and is applied to both old and new concrete surfaces, and follows use of the zinc sulphate wash which is used on new concrete. When the binding and suction coats have become dry, the finish coat is applied to the surface. This is usually a stain made of boiled linseed and Chinawood oils, thinned with turpentine or naphtha, and colored with mineral pigments. Exterior lead and oil

The Concrete Ribbed Ceiling in Al Malaikah Temple, Los Angeles, is Effectively Painted
John C. Austin, Architect

paints may, however, be used, since they dry to elastic, water-resisting films, which fill up the pores of the surface. Flat, egg shell, and gloss interior oil paints, as well as finishing lacquer may also be applied, choice depending on circumstances.

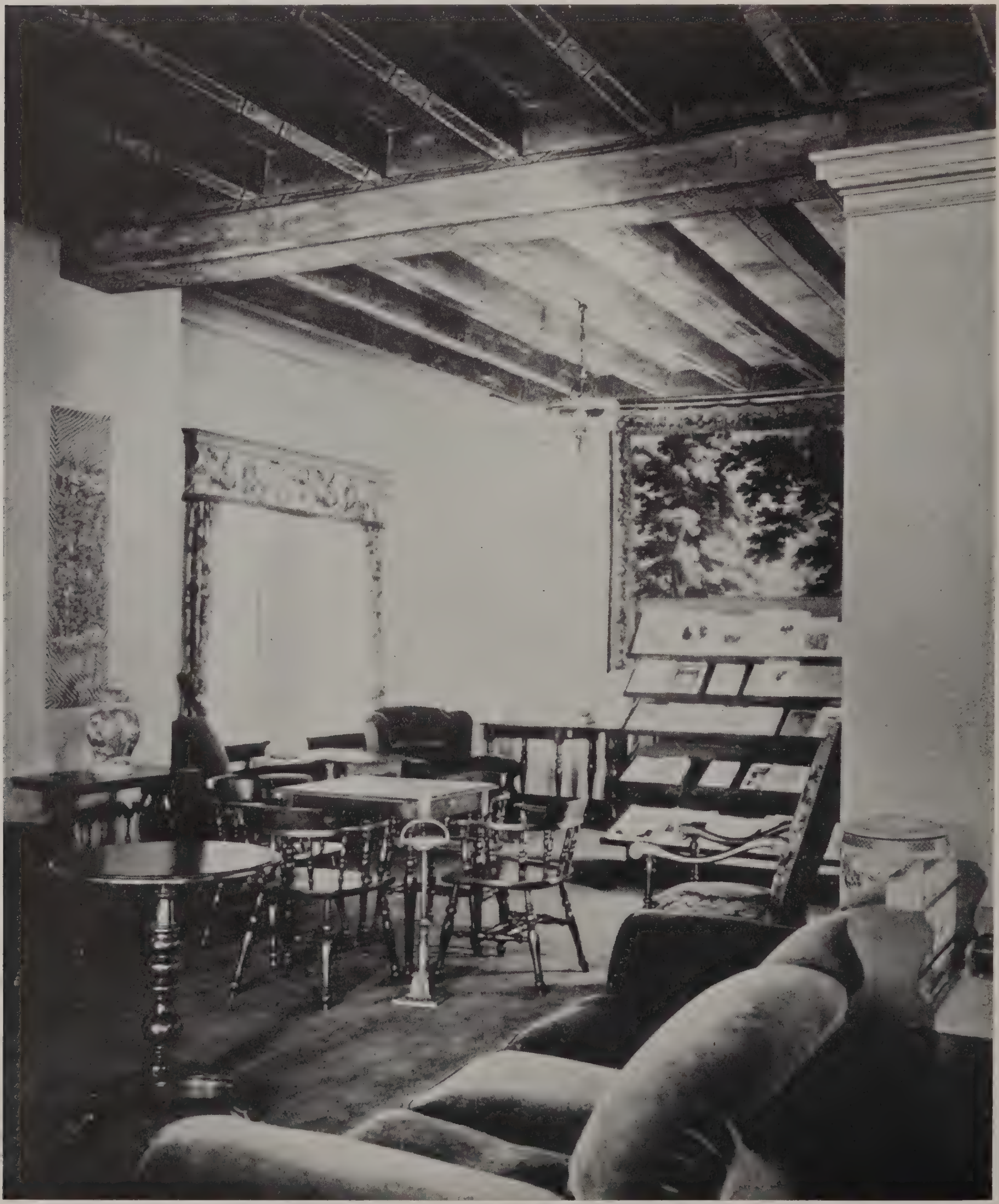
From the standpoint of beauty, probably the best work has been done by staining the entire surface and then applying brilliantly colored paints to small areas by means of stencils. When this treatment is employed, the texture of the concrete in the stained area becomes an integral part of the decoration. When this technique is employed, the stenciled decorations are applied after the paints have dried. Various combinations of white lead, lithopone, zinc oxide, titanium oxide and inert pigments mixed with either linseed oil or heavy bodied enamel liquids have been used successfully for this work.

When stains are being applied, an elastic technique can be developed by using thin stains of low color value. Light areas can be built up to dark by the application of several coats. Ragging, smearing, and other reliefs from a solid surface can be secured. For any given color the number of coats will control the density. The final coat may be clear varnish, shellac, or lacquer, provided that it is applied after the underlying films have thoroughly dried. This is of course quite necessary.

Concrete floors can be finished with lead and oil paints containing abrasion-resisting pigments. Most manufacturers produce paints for this type of work. Their successful use depends upon application to a dry floor slab. The films they produce will give good service if the traffic is moderate and evenly distributed. Trucking, the dragging of heavy boxes, and the shuffling of feet are destructive of floor paints. If a floor will be subjected to such abrasive action, color should be provided by using mineral coloring pigments in the floor topping. General rules cannot be given for the application of cement and oil paints, since each manufacturer prepares directions applicable to his own product. As these directions vary somewhat, the technique of application is not uniform. The surface should, however, be prepared in the manner described for oil paints. Cement and water paints are made by mixing a dry powder, consisting of Portland cement and other pigments, with water. This mixing is done on the site. These paints usually dry to a flat finish. The concrete surface is wet down with water before the paint is applied. As the cement in these paints ought to be hydrated, they should be allowed to dry slowly.

The method of application is dependent upon the brand being used. For this reason, the manufacturer's directions should be closely followed.

As there are several techniques whereby paint can be applied to concrete surfaces, the architect of today can produce distinct effects by decorating exposed structural members. The architect who regards modern design as a significant matter and the architect who is wedded to traditional forms can make the exposed members of their structures form inherent parts of their decorative schemes without compromising their professional principles. The elasticity with which paint may be applied to concrete offers new opportunities for artistic treatment. The fact that the various techniques are in accord with sound construction principles assures the architect that he can specify this method of treatment with certainty that the resulting finishes will be permanent in character.



Painted Concrete Ceiling Beams Give This Reading Room Its Distinctive Character

SCHOOL CONSTRUCTION AND MODERN EDUCATION

BY

J. CAYCE MORRISON

ASSISTANT COMMISSIONER FOR ELEMENTARY EDUCATION, STATE OF NEW YORK

BEFORE me is the west wing of a beautiful building devoted to the preparation of teachers for the public schools. It stands four stories, on broad grounds, overlooking a magnificent cluster of forest trees, facing the setting sun. As one looks toward it from the distance, one takes in simple vertical lines—an effect secured in large measure by windows, arranged in rows, alternating groups and single windows—from basement to roof. Outwardly, the effect is all the most critical artist could ask. Entering, one walks down the corridor past the open doors of six executive offices. These offices measured in floor area are approximately the same size; each is to accommodate three professors. Alternately, they have one single window, then a bank of three windows, a single window, again three, and so on. Half these office rooms are flooded with light, cheery even on relatively dark days; half are dark and dreary. The man who draws the strategic position next to the window fares reasonably well; the other two are doomed to strain their eyes in comparative twilight on bright days and to resort to electric light the remaining time. For what purpose, windows? To serve as exterior ornamentation or to supply light to those who work inside? This one incident, typically legion, illustrates the great conflict going on between the older school of architecture, which looked only to outward design, and the new which dictates that all architectural detail shall be subordinate to purposes the building serves.

Not so many years ago, a school building was an aggregate of classrooms, a collection under one roof of a number of one-teacher schools. A world war drove home to the public consciousness the value of physical training as a means of education. Physical education requires a gymnasium. Boys and girls need different exercises. Therefore, two gymnasiums in large schools, and one in every school. Gradually, there evolves a philosophy of education, which formulates the doctrine that to properly prepare children for citizenship they should have 12 years' practice in the exercising of citizenship. But practice in citizenship requires a public forum—therefore, the auditorium. The "little theater" idea grows. "The play's the thing." Why not teach the drama through developing the dramatic instincts inherent in children? The auditorium becomes a little theater, and lends itself as readily as would the Metropolitan to the budding musicians and artists of the school population,—to genius developing.

Here and there, ever more frequently, from the voice of the people comes the thought that music and painting—the fine arts—constitute a part of the fundamental need in the training of children, quite as much as do the three R's of the olden times. And so the architect must find a way to include a studio that will inspire children to strive for the artistic; and a music room that will have its orchestra pit, its stage, its separate exit, its comfortable provisions for a small audience—yet be soundproofed from the remainder of a building. A generous community authorizes its authorities to add swimming to the school curriculum. Where shall the architect place the pool—in the basement as a companion piece to coal bins and ash scuttles, or in a wing under a skylight, with borders of ferns and palms, with theater chairs for the spectators, where an hour in the pool becomes a joy and delight, where swimming adds to grace and muscle and becomes an exhilarating experience in a dignified setting? The teachers of household arts demonstrate the necessity for a laboratory. Their laboratory is a home—at least an apartment. Can the architect build an apartment that would kindle the eyes of a bride yet build it in a public school building? Many architects have tried; few have succeeded.

The public school must serve those who will labor with their hands as well as those who will work with their brains. Carpentry, plumbing, electric wiring, blacksmithing, automobile repairing, and a score of other trades must be provided for in the instructional program of the school. It is a long cry from the aggregate of classrooms constituting the old school to the new building that includes shops for these various trades. What kind of an arrangement of space and light will best serve the interests of the commercial department? Is there to be a history room? A geography room? A mathematics room? An English room? A Latin room, and so on? Each has its own special needs, requiring a special adaptation of all the elements out of which architects weave their magical effects.

Without carrying this analysis further, it is evident that the men and women who are using public school buildings have found an articulate voice, and that architects must plan their work primarily in terms of the services the several parts of the building are to render, and that only after this end is attained may they consider the outward architectural effect. Nor is the matter as easy as even the foregoing would imply. Our

There is Educational Value in Good Design and Construction of Schools
Main Building and Auditorium Wing, Public School, Lake George, N. Y.
Edward S. Hewitt, Architect

conceptions of the services the school should render have undergone tremendous changes during the past 25 years. Schools erected near the close of the last century are now hopelessly out of date. Our new buildings of fireproof construction should be good for a half-century, at least. But who is wise enough to foresee all the uses that any community may want to make of its buildings 50 years or even 25 years hence? The room planned for biology now may be needed a year later for a school clinic, and the household arts laboratory apartment may take to itself the more prosaic function of recitation rooms. Even the wings devoted to the ordinary classroom service of our elementary schools at the present time may a decade later be transformed into the special laboratory rooms of a new type of elementary school organization that throws into the discard our varied compartment type courses of study. We want our architects to give us flexibility. Partitions will come out, new partitions will go in, yet ventilation, light, exits and a dozen other details must fit the new arrangement.

Gymnasium Wing of the Public School,
Lake George, N. Y.

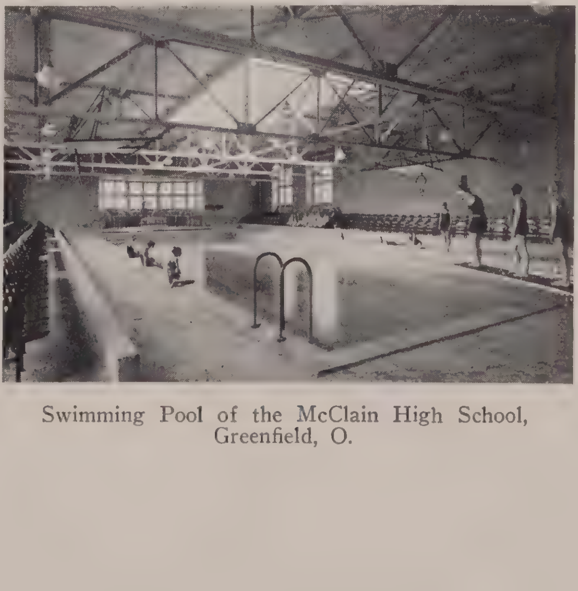
A word further concerning the adaptation of school buildings to the hygienic, sanitary welfare of those who work in them. I accept a position in a great educational organization. I am assigned to a small office with a double window at one end, overshadowed by a monstrous building designed for religious worship. Three assistants share this office with me. Except on rare summer days the light from the window is insufficient. An electric light from overhead makes possible the accurate statistical work we are to do, cross lights on the paper, the glare of an electric light from improper fixtures. More trade for the oculist. As good a pair of eyes as man was ever given crippled for life. In thousands of American private and public school classrooms the same sin is being committed against little children who have not the right nor the understanding to protest, and this goes on continually.

Rooms such as this Library and Study Hall exert an Influence of Themselves
Edward Lee McClain High School, Greenfield, O.
William B. Ittner, Architect

We have not yet solved all the questions of ventilation. Shall warm air enter on the level of or above children's heads, which should be relatively cool, or at their feet which should be relatively warm? Shall toilets be placed in comparatively dark, inaccessible corners of the basement, or shall they be so located as to derive all the natural sanitary benefits obtainable from the sun's rays? To be sure most of these questions of adaptation to hygienic and sanitary needs are answered in the Strayer-Engelhardt Score Cards for Elementary and High School Buildings—detailed specifications, built up over a period of years with the assistance of the best minds in the engineering and architectural professions. The tragedy is that throughout this country school buildings are being erected under the supervision of architects who make no effort to know or understand these issues and the remedies that are available.

But to plan a building that meets the best known tests as to hygiene and sanitation, that serves adequately all the educational functions to be carried on within its walls, and that is flexible enough for adjustment to all reasonable variations in school procedure—even the attainment of these ideals is not enough. The demand for standard classrooms, for adequate lighting, for economy of construction has brought about a type of school architecture that readily lends itself to the criticism that it is factory-like, that it is a living expression of the spirit of people who think only in terms of unit production, and have no higher thought than the black smoke which is being poured from a factory furnace.

We have gone a long way toward attaining efficiency in plan, economy in construction. Can we attain beauty without extravagance? I have in mind two school buildings, designed to accommodate approximately the same number of pupils, opened for use during the past year, both dedicated within the present month. One is plain,



Swimming Pool of the McClain High School, Greenfield, O.

Public School Building at Beaver Falls, N. Y.
Franklin P. Hammond, Architect

stern, forbidding, lacking in every quality which appeals to the eye appreciative of the beautiful in architecture. The other is simple in design, soft, mellow, with a touch of the Colonial, pleasing to the eye, inviting to the wayfarer who would seek a quiet place for repose. The first cost more than $200,000, the latter less than $100,000. Why the difference? I think the chief element in the difference was the architect. Another question! Which will prove the best educative influence in the lives of the generation of children that will pass through its portals?

I sat late one afternoon in the library room,—the most beautiful schoolroom I have ever seen,—with the principal and superintendent of the Edward Lee McClain High School, Greenfield, O. At one end was a beautiful mural depicting the harvest season of America, at the other was an equally attractive mural of the immigrant coming to America. Here and there were paintings and statuary. The tables were of oak in simple design. The chairs were Windsors. I noted the ferns with long hanging fronds against the paneled walls, and windows that furnished ample light yet melted into the general effect. The principal was saying, "We have been in this building eleven years, and last month we erased the first pencil mark. A new boy who had just come to us wrote his initials on an inkwell. He had been here only a week and had not yet caught the spirit of this school." And the superintendent added, "We are proud of that record," and, a little later: "We know here that this type of school building and furnishings has an educative influence on the minds of children."

Assembly Room of the Public School at Beaver Falls, N. Y.

I go before one school assembly. Dust-covered physical apparatus is in evidence. The odors of a poorly ventilated gymnasium are obvious. The walls are spotted from the prints of the basket ball and are lined with pencil marks. What impressions will these children take home? I go to another assembly. The walls are tinted a light

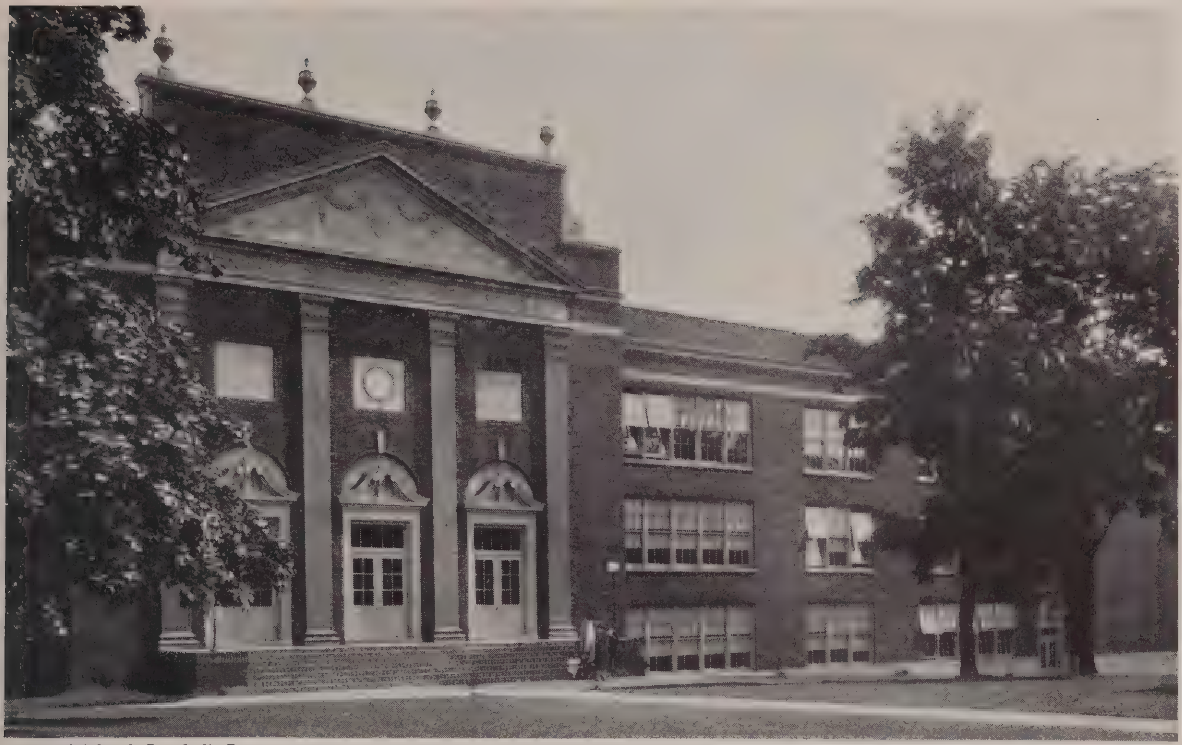
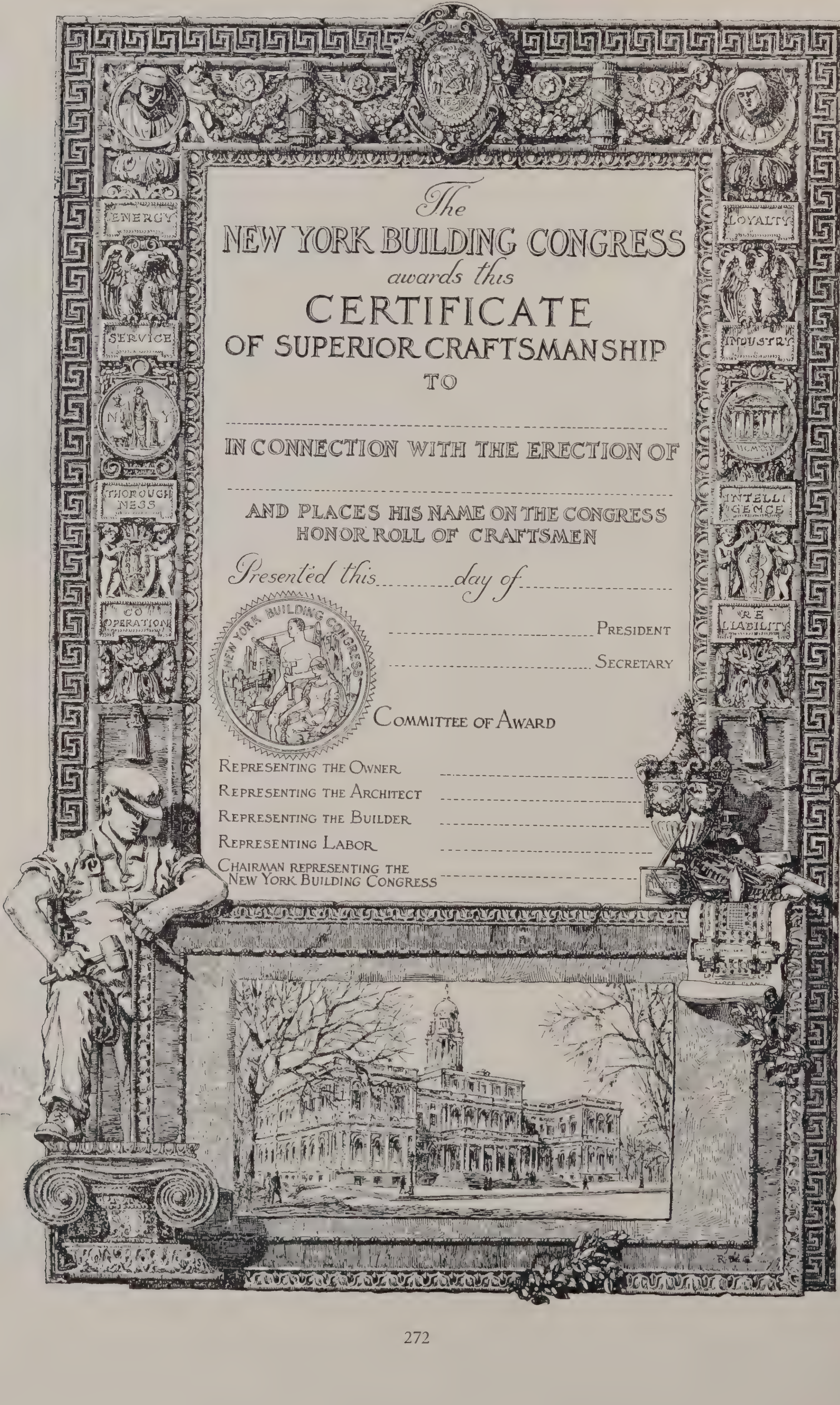


Photo. Richard Southall Grant

High School Building at Cornwall-on-Hudson, N. Y.
Tooker & Marsh, Architects

blue. The beams and columns are delicately lined. The chandeliers would grace the home of wealth and culture; they are simple in design and soft in effect. The curtains on the windows and on the stage blend into the harmony of the room. Back of me the paneling at the rear of the stage lends its grace of line. What will the children who sit here day after day unconsciously absorb into their impressionable natures to become an indelible part of themselves and all they meet? "If you get simple beauty and naught else, you get about the best thing God invents." Will not the children who spend five to eight hours daily, 200 days a year, for 12 years in a school building that expresses simplicity, harmony, beauty in its every detail come to feel in their inner consciousness a delight in beauty, a love for it, a feeling of need for it? And, conversely, will they not come to feel a certain repugnance for crudity, come almost to the point where they will be hurt by the clash of colors, the loss of symmetry, the ill proportioned? Will not the children who spend 12 years in a beautiful building consciously or unconsciously carry the effect of their sojourn into their own homes? And may we not, in a later generation, have a recrudescence of the beautiful in our homes and home furnishing that is now so sadly lacking in a great part of America's home building? The attainment of beauty demands more than wealth. It is a reflection of an inner spirit, and it can find expression in the humblest dwelling as well as in the greatest mansion. Every touch of the architect's pencil, every line of his specifications mean beauty or the lack of it, not only in his building, but more so in the hearts of the children who use it and of the teachers who instruct.

But the public schools serve more than children. They may shape the feeling if not the thinking of the grown ups who enter occasionally but pass them daily. In the little village at the lower end of New York's most beautiful lake stands a new public school building. The main center building with a wing at either end—one for auditorium, the other for gymnasium—is beside the main highway. It stands on high ground, surrounded by a new growth of native forest, facing across the lake to the mountains beyond. In every detail there lives again the best Colonial of the Georgian period. It embodies the spirit of the forefathers, a fit expression of the Colonial period through which the village gained its first fame, a beauty spot in an attractive modern village, and a fit companion piece to the famous lake. It is a challenge to the passerby to stop and question why his community cannot build likewise. A view of Lake George's beautiful new school raises the hope that in time our public school buildings may come to express the true spirit of the communities in which they stand.



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Presented this ________ *day of* ______________

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Committee of Award

Representing the Owner ______________________
Representing the Architect ______________________
Representing the Builder ______________________
Representing Labor ______________________
Chairman representing the New York Building Congress ______________________

RECOGNITION OF CRAFTSMANSHIP

HOW IT IS PUT INTO EFFECT

BY

WM. O. LUDLOW

AN article in The Architectural Forum for January quoted some statements of representatives of many of the elements of the building industry,—owners, architects, contractors, and labor,—telling of the interesting results that have been accomplished in New York by the awarding of certificates and gold buttons to the most proficient mechanics on large buildings recently erected.

The remarkable popularity of this "Recognition of Good Craftsmanship" seems to be further indicated by the recent organization of committees to conduct this work in a number of large cities of the country. These committees have been formed generally by the chapters of the American Institute of Architects. In many more places other chapters have such a program under consideration, and it even seems quite possible that the Royal Institute of British Architects will set up in Great Britain work of similar character. The reasons for this popularity are not far to seek, but it may be well to review them.

First, and most important in my estimation, is the fact that there is an underlying consciousness in every man that there is really something more of interest in his life than merely getting the "almighty dollar." I know this is not always recognized, even by the man himself, but a careful examination of the real motives that actuate most of us discloses the fact that such sentiments as loyalty, good will and friendship are really the moving factors in what we do. Now this approval of the recognition of merit is primarily brought about by a sense of fair play, friendly feeling and an appreciation of the value of good work. Lincoln once said he tried to base every decision of his life on "what is right," and when he had accomplished that, he had invariably made the right decision. The recognition of a man's worth and the worth of fine accomplishment is inherently "what is right."

There are, of course, other elements which enter into the cause of the popularity of this movement. Nearly everybody wants good work, and this is surely an incentive to giving good work. Everybody in the building trades desires work done with the least possible friction and with the best possible understanding among those who produce the work. Recognition of Craftsmanship helps to this end by providing for the workmen an incentive beyond merely the pay envelope. Another reason for the popularity of the Recognition of Craftsmanship is rather more sordid, but a reason yet to be recognized. It is the feeling of the owner that he not only gets a better building, but that he gets considerable advertising out of the fact that his building is constructed by men who are publicly recognized for superior workmanship.

Of course, the architect is glad to have his building recognized in this way, and perhaps too, if we may dare say it, he is glad of a certain amount of acclaim which will come to him as the architect of the building. But further than that he is the one, more than any other, who is interested and insistent on the good quality of the workmanship that goes into his building. Then, too, the contractor of the better class likes this method of recognition of good work, very much for the same reasons as have been accredited to the owner and architect, but he is particularly anxious that it shall be known that he is a builder of well built and notable structures.

As to the men themselves, little need be said as to why they appreciate this recognition. One simply has to imagine oneself in the place of one of these men to know how he is likely to feel when, in the presence of his fellow workmen, he is called to the platform to receive from the hands of the representative of an impartial body a handsomely framed certificate and gold button and told that he has "made good."

Further, it is not hard to understand why this work has appealed to such a number of chapters of the American Institute of Architects. First of all, the better class of architects, as a rule, are men who appreciate the higher motives of life, as well as a better quality of workmanship. Then, some of these chapters have felt that this kind of activity, with its attendant publicity, gives them a standing in the eyes of their community as a group of men interested not only in their fees, but interested likewise in quality work and the welfare of the men who produce it. Many chapters perhaps also feel that they need an activity that will command the interest and enthusiasm of their members if they are to hold their organizations together. Perhaps also the rather remarkable spread of this work is further due to the comparative simplicity of setting up the necessary machinery either by a Building Congress, where such exists, or by a chapter of the American Institute of Architects.

The question is often asked, "How do you start such a program?" I venture these suggestions:

1. The whole plan should be placed before the

Congress or chapter in such a way that the members will not only see its advantages but shall really become enthused. A committee should then be appointed to take charge of the work, and I should like to make emphatic at this point that the success of the work will depend on whether or not the head of the committee has outstanding ability and a real enthusiasm for the cause.

2. The step that the committee should first take is to get the whole-hearted interest of some of the best builders in the city, and also to get the interest of labor, for unless these two elements are brought in "on the ground floor," the processes of "selling" are more difficult. There should be a real feeling of partnership among the architects, builders and labor to obtain whole-hearted coöperation. This partnership is necessary also to prevent the feeling on the part of the workmen that they are being patronized; labor will not be patronized. Moreover, the workmen are likely, at first, to be suspicious of some ulterior motive,—suspicious particularly of an attempt to "speed up." Enlisting labor leaders on the partnership basis dispels this.

3. Awards are of two general types. (a) On large buildings, to the best mechanic in each trade, with appropriate ceremonies of presentation held in the building while under construction,—one ceremony about the time of enclosure, with awards to the structural trades, and another shortly before completion with awards to the finishing trades. (b) Individual awards, the honor men being selected irrespective of the building where employed. The (b) method is most useful where few large buildings are erected.

4. In type (a) awards, nominations are requested from the architects and contractors in coöperation with the superintendents and foremen. In type (b) awards it is advisable that nominations be received only on solicitation by the committee from trusted individuals.

5. The awards are made to encourage workmen to better effort and are not made to foremen or to those in executive or supervisory capacities.

6. Nominations are of value only as coming from nominators who have been thoroughly informed as to the real purpose of the awards. In selecting the candidates for awards, favoritism or any appearance of favoritism must be carefully avoided.

7. When a building has been selected for award a special "Committee of Award" should be appointed, this committee to consist of the owner, the architect, the builder, a representative of labor and a representative of the awarding organization.

8. The best means of selecting the men to be honored is to explain the idea very fully to the superintendent and to the foremen on any particular building which is of such character as to merit the awards. The foremen should be instructed to select with great care one or two of the best men working in each of their particular trades. These names are then passed on to the superintendent for approval and then should go to the Committee of Award for final determination. It is highly advisable to have some outstanding labor man on the Committee of Award in order that the names may be vised by labor, and in order that nothing may be inadvertently done which would be unfortunate from the labor angle.

9. Ceremonies of award should be made as impressive and as important as possible. Awards are public; all workmen on the operation, their wives, their friends, and the general public are invited.

10. Photographs of presentation ceremonies, news items, and articles on the value of craftsmanship featured in the public press, and the widest publicity possible for the awards and their purposes are essential.

11. It is quite possible for the entire work to be conducted without any expense to the organization which sponsors it. In New York practically the entire cost is borne by the owners of the buildings. A charge of about $10 to cover the cost of each certificate, gold button and clerical work is borne by the owner of the building. It has been found that there is no difficulty in persuading owners to do this, as a matter of $100 or so is a comparatively small item on a building enterprise involving hundreds of thousands of dollars. Moreover, the owners readily recognize the considerable advertising advantage which they get from awards being made on their buildings, even though they may not have a broader vision of the splendid ideals upon which the movement is founded.

In New York we have found it surprisingly easy to enlist the sympathy and coöperation of owners, architects, builders and labor, for all of these elements, if not interested principally from an altruistic motive, see at least a personal advantage of great possibilities. Of course it is most desirable, however, to put the whole matter where it deserves to be placed,—on the high plane of great and splendid service not only to the building industry but to every individual concerned,—for the stirring of ambition to do nothing but a high grade of work ennobles a man's whole life, brings him a contentment that he has not known before, makes him a man of finer ideals, and in a word does something to create a better citizenship as well as a far worthier nation.

DETERMINING FUEL REQUIREMENTS BY THE DEGREE-DAY METHOD

BY

P. E. FANSLER

ASSOCIATE EDITOR, HEATING AND VENTILATING MAGAZINE

LATE one afternoon, bound to Washington on the "Congressional," I fell to speculating on the possibility of developing a plan whereby fuel requirements could be pre-determined for any building in any part of the country by an engineer or architect located in any other part of the country. It was a problem at once difficult and fascinating. In the old days of the heating industry, the contractor, making up an estimate of radiation requirements, would enter a room, give it what was in those days the equivalent of the "once over," jerk his thumb at the ceiling and say: "This room needs about 35 feet." Perhaps this procedure was responsible for the phrase "rule of thumb!" Usually his "guesstimate" was pretty close to the amount of radiation that would be determined through the use of modern rules and tables, but such procedure was entirely localized; had this contractor been asked to estimate for a building located where the weather conditions were materially different, he would have been completely at sea. The rising tide of scientific achievement has evolved tables and methods whereby the heating engineer in New York can determine radiation requirements for a building in Minneapolis, Chicago, St. Louis or Seattle with equal ease and accuracy.

This was the thought foremost in my mind. Would it not be possible to evolve a method of evaluating *heating loads* in different cities so that graphs or similar devices could furnish accurate data upon which fuel determination and comparison could be based? Engineers of the American Gas Association, some years earlier, had determined that a "daily mean temperature" of 65°, as defined and reported by the U. S. Weather Bureau, was the dividing line below which the average home owner required artificial heat and above which it was not necessary. This was a purely empirical determination, made over an extended period of time and covering a sufficient number of cases to insure accuracy. Some bright mind then coined the term "degree-day" to represent the product of a "difference of one degree below this datum point" and a "24-hour period." In other words, with a "weather bureau temperature of 65°, a condition of equilibrium exists, and no artificial heat is required. It might be thought that this is too low a temperature, but it must be remembered that, where the "daily mean" is 65°, the temperature during daylight hours will be 70° or above. If, now, the daily mean temperature is 64°, it is apparent that the heating requirements for this 24 hours can be measured by (65°-64°) 1° x 1 day, or 1 degree-day. Likewise, with a daily mean temperature of 60°, the heating load could be designated as 5 degree-days, and with a daily mean temperature of 37°, the quantity "28 degree-days" would be the measure. I have had quite an extensive correspondence trying to find out who first used the term "degree-day," seeking to place the credit where it is due, but without success. Certain it is that it was used as far back as six years, and perhaps farther. It is only for the last three years, however, that the value of this term has been appreciated, and it is largely through influence of the American Gas Association and *The Heating and Ventilating Magazine* that its use is spreading.

Having thus formulated a method for measuring and designating the heating load for any given day, based on the establishment of the point below which heat is required and of the factor representing the amount of heat demand, it is a

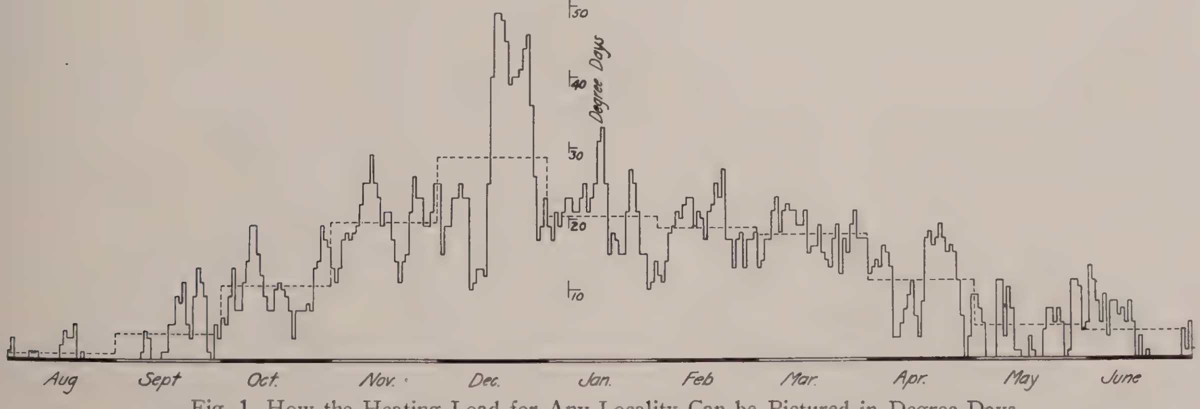

Fig. 1. How the Heating Load for Any Locality Can be Pictured in Degree-Days
Heating Requirements for Portland, Ore.

simple matter to find how much heat is required over a month or a heating season by adding together the heat demand for the several days involved. We then have an expression of the heating load for the month or the year. For the architect or engineer, trained to visualize from graphs and charts, it is a simple matter to plot the heating load for any given locality. For this purpose recourse is had to the records of the U. S. Weather Bureau, covering 50 years or more. To be of value, the heating load must be determined from average data, as a base; then supplementary computations can be made for current, or any other, requirements.

Heating loads in degree-days of four characteristic cities are shown here in Fig. 2. The contrast between the graph for Los Angeles and that for Minneapolis, and the similarity of the New York and Minneapolis profiles are evident. The Portland, Ore., graph shows a condition that is ideal for heating with gas. The maximum is only about half that for Minneapolis, yet the heating season lasts for ten months of the year.

The next procedure was to determine the heating loads for each month and to convert these into percentages of the annual load. This makes it possible to pre-determine the fuel consumption for any month in the heating season. Fig. 3 shows how these data can be plotted. This presentation has proved of no small value to the oil-burner salesman who makes a sale late in the season. Soon after the completion of the first month of use, which might be December, the salesman has a telephone call or a letter from an irate customer. He is informed that he has grossly misrepresented the burner, and that, while it has operated in a satisfactory way, it has used an excessive amount of fuel. The customer, reading his tank gauge, has found that he has consumed nearly 500 gallons of oil. He figures that there are eight months in the heating season, and that therefore he will use 4,000 gallons for a complete season. The salesman had told him that he should use between 2,500 and 3,000. This looks as though he had been "stung." Then the salesman must take the time to call on the customer, show him the graph (for that particular city) and point out that in December a consumption of 20 per cent of the total for the season is correct. This would mean, for the whole season, 2,500 gallons. Such use of these graphs has been, and is, common. Another use is to show whether the heat demand for any given month is above or below the normal demand for that month. February, 1927, in New York, was an unusually warm month,—at least everyone commented on the weather from day to day. The graph, Fig. 7, presents the facts of the case. Only on six days of the month was the heat requirement up to normal. Fuel consumption during that month was far below normal.

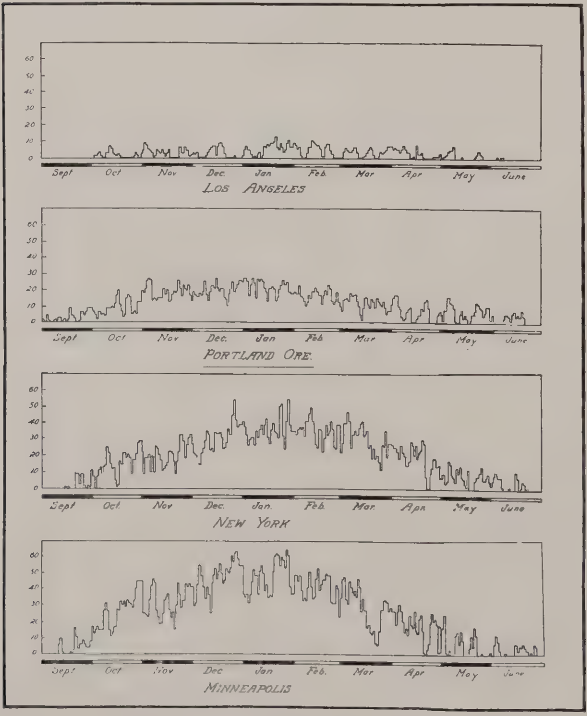

Fig. 2. Graphs of Heating Loads of Four Typical Cities. The Long But Not Intensive Heating Seasons in Los Angeles and Portland are Important Factors in the Widespread Use of Electricity for Heating in Those Cities

Now we come back to the beginning of this story. I wanted to find some way of expanding the degree-day idea and to enlarge the scope of its usefulness. The idea was to compute degree-day heating loads for hundreds of towns where U. S. Weather Bureau Stations were maintained, and to mark down the degree-day figures on a large map of the United States. Then, by drawing flow lines through points where the heating loads were equal, I would have a chart possessing something of the nature of an iso-thermal chart, except that the "contour" lines should represent "heating load." Then any building located on any iso-degree-day line would require, for each square foot of radiation, the same amount of heat that would be required by any other building located anywhere on the same line. The idea was simple, but the computations arduous.

More than 12,000 computations were made and checked. Now, what does it mean, and of what practical use is it? A logical step toward making it practical was the production of three derived charts, an iso-coal consumption chart; an iso-oil consumption chart, and an iso-gas consumption chart. Each of these affords a direct method of finding how much of any specific fuel is required for a normal heating season to provide for 1 square foot of radiation, assuming always that the radiation has been properly placed and is adequate. If the radiation is excessive or insufficient, the results will vary in the same ratio.

The "degree-day" figures on the iso-degree-day chart have been replaced, on the iso-oil-consumption chart, by figures representing the gallons of oil necessary to provide heat for 1 square foot of steam radiation under certain defined conditions, one of which is that the efficiency of the heating plant has been taken as of 100 per cent. This may seem illogical, but it is quite the opposite. It is easier to determine the consumption at 65 per cent efficiency where it is known at 100 per cent

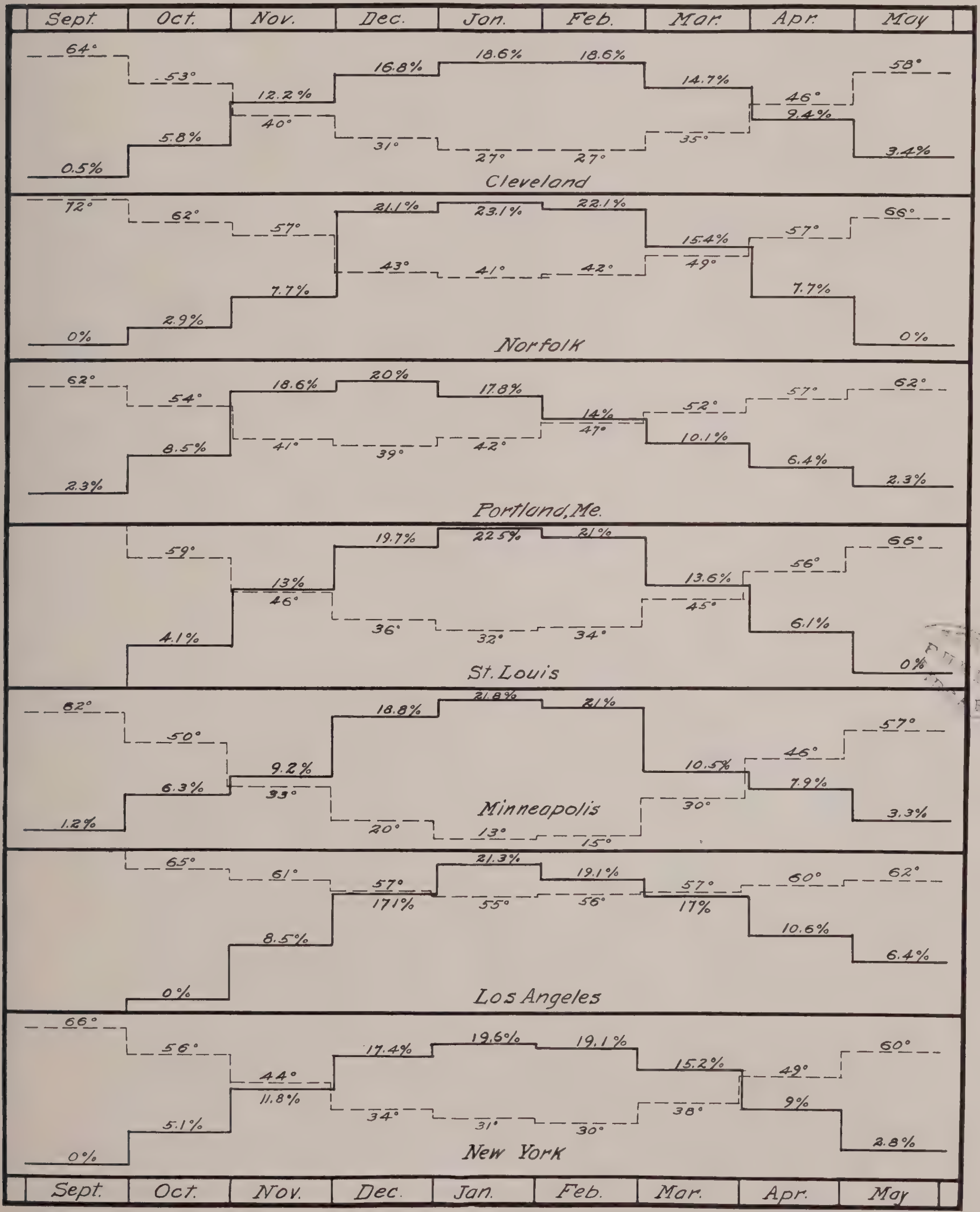

Fig. 3. Average Fuel Requirements for any Period for any Fuel Can be Determined from Charts. Solid Lines Show Percentages of Annual Fuel Requirements; Dotted Lines Show Average Mean Temperatures

than it would be to use 75 per cent, or any other figure, as a base. In the latter case the thoughtless individual might jump to the conclusion that 75 per cent was a fair average value, and thus derive a quantity well under what it should be. Reference to the iso-oil-consumption chart (Fig. 5) shows that for a heating load of 1,000 degree-days, and assuming a heating plant efficiency of 100 per cent, there will be required 0.686 gallons of oil fuel *having a heating value of 140,000 B.t.u.* per gallon; also it is assumed that *steam* radiators are under consideration, and that *the radiation was designed for a 0° outside temperature and a 70° inside temperature.*

It will be a simple matter to make fuel determinations after having followed through the solution of a typical problem. We will take Chicago as an example. What quantity of oil having 130,000 B.t.u. per gallon will be required to heat a house with 730 square feet of standing water radiation? (In Chicago radiation is figured on the basis of a minimum outside temperature of —10°.)

The average heating load, taken from the table on page 281, is 6,000 degree-days. There would be required, then, 6 x 0.686 gallons, or 4.11 gallons of oil having a heating value of 140,000 B.t.u. per gallon. Now, we will assume that the boiler in the house under consideration is a new and first class unit, well adapted to the application of an oil burner. Under these conditions it is possible to attain a seasonal efficiency of 60 per cent. As a matter of fact, the selection of this "seasonal efficiency" figure is the real trick in the application of this method; a reasonable knowledge of heating plant operation will, however, aid in the judicious selection of this factor. It might be well to suggest that proper figures will range somewhat as these:

For gas-fired boilers....	65%—70%
For oil-fired boilers.....	55%—65%
For coal-fired boilers....	35%—50%

It will be noted that the range for oil and gas is less than for coal. This is due to the fact that fluid fuels are automatically fired and almost always thermostatically controlled. Consequently the operation of fluid-fired plants is more uniform than would be the case with a hand-fired fuel, in residence work. One important factor in bringing about the relatively high efficiency of gas and oil is the intermittent functioning of heating plants in which these fuels are used. Where coal is used it frequently happens, during the fall and spring, that a day or days will come on which no heat is wanted. But the coal fire continues to burn, producing heat that is not wanted; it is a

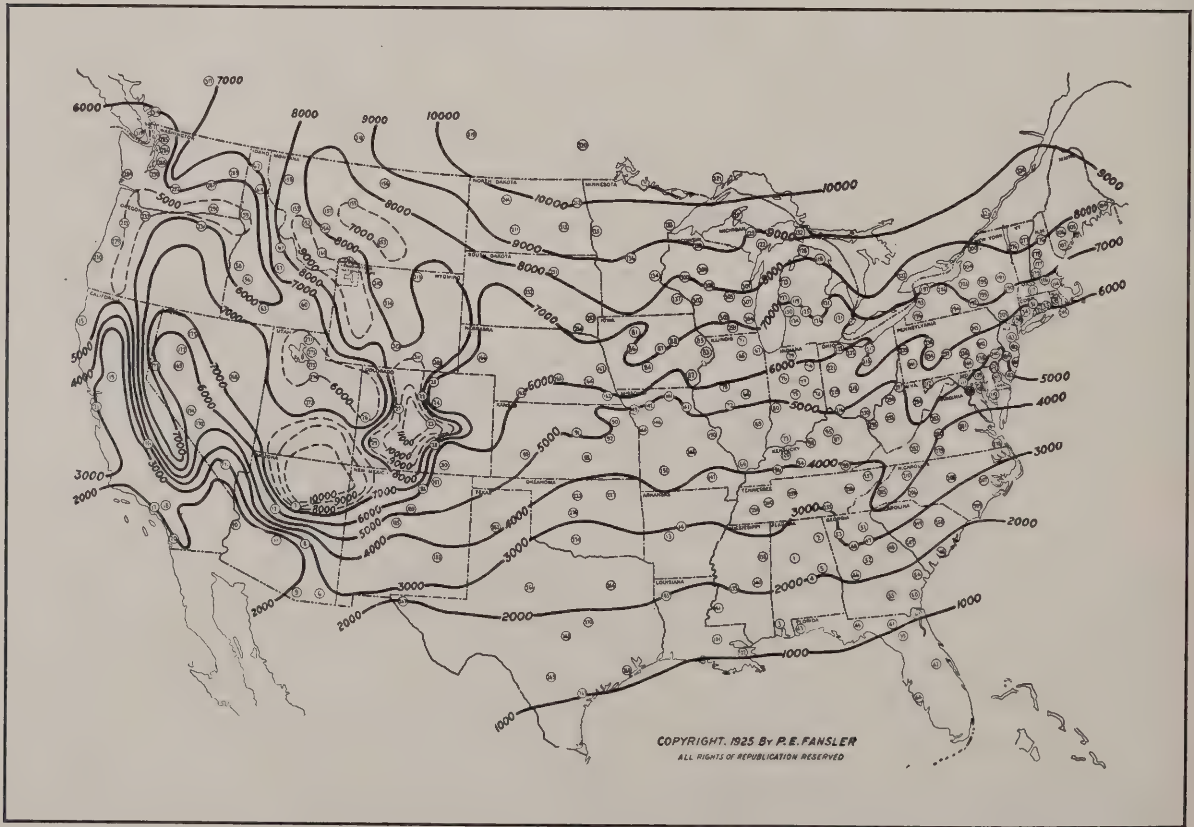
7000
6000
8000
9000
10000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
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Fig. 4. Iso-Degree-Day Chart of the United States Showing Heating Loads in Degree-Days (See Tables on Pages 281 and 282 for Cities)

condition that warrants the conception of a plant's operating at what is *negative efficiency.*

But, to get back to our problem, allowing for an efficiency of 60 per cent instead of 100 per cent, there would be required—

$$4.11 \text{ gallons} \times \frac{100}{60} = 6.85 \text{ gallons}$$

per sq. ft. radiation per season.

We now must correct for the difference between the assumed heating value of the oil and that of the oil under consideration, and we have:

$$6.85 \text{ gallons} \times \frac{140{,}000}{130{,}000} = 7.38 \text{ gallons}$$

The heating plant was designed for minimum outdoor temperatures of —10°, instead of 0°, so we will have to correct for this design difference. The relative temperature differentials will be $70° - 0° = 70°$ and $70° - (-10°) = 80°$, so we have:

$$7.38 \text{ gallons} \times \frac{70}{80} = 6.46 \text{ gallons}$$

The last correction is due to the fact that water heating is specified rather than steam, and we have, as a factor, the ratio of the heat emission assumed for these media, or:

$$6.46 \text{ gallons} \times \frac{150}{240} = 4.04 \text{ gallons}$$

As there is a total of 730 square feet of radiation, the fuel requirement will be:

$$4.04 \text{ gallons} \times 730 = 2{,}949 \text{ gallons}$$

It will be seen that this process consists in applying to the base figure, as taken from the iso-degree-day chart, a series of corrective factors, each providing for variations from the assumed conditions. The operations are simple, and the entire calculation can be made in five minutes. Correspondence on this subject has brought out the question of possible error due to the fact that no account is taken of wind velocity. Such a correction should not be made, because if the radiation has been correctly determined, sufficient has been provided to take care of heat loss and infiltration due to windage.

Factors used in localities where radiation is calculated on outside temperatures other than 0° are:

For Minimum	Multiply By
—10°	7/8
0°	1
+10°	7/6
+20°	7/5
+30°	7/4, and so on.

For minimum outdoor temperatures higher than that used as a base (0°), it is obvious that less radiation will be installed in a given room.

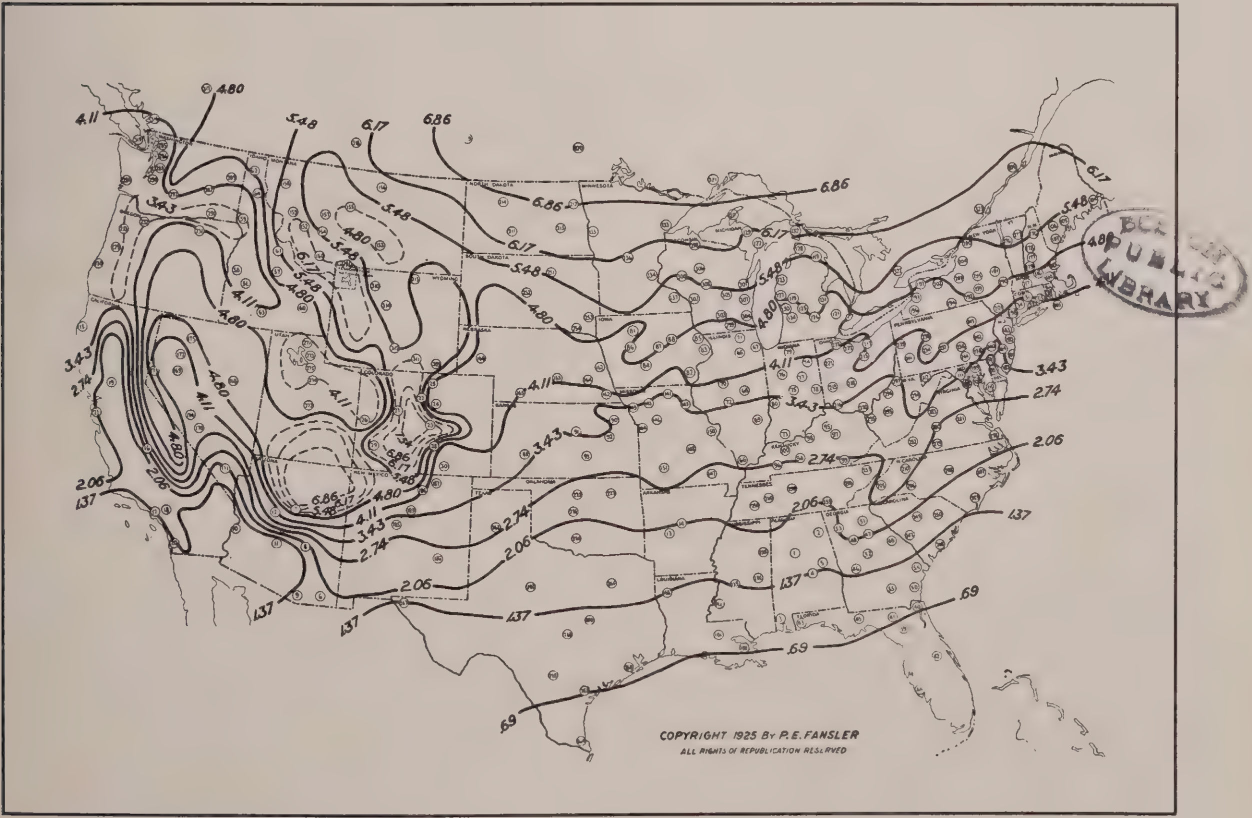
4.80
4.11
5.48
6.17
6.86
3.43
2.74
2.06
1.37
.69
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Fig. 5. Iso-Oil-Consumption Chart Giving Gallons of Oil Required for One Square Foot of Steam Radiation (Assumed Heating Plant Efficiency 100 per cent. See Text)

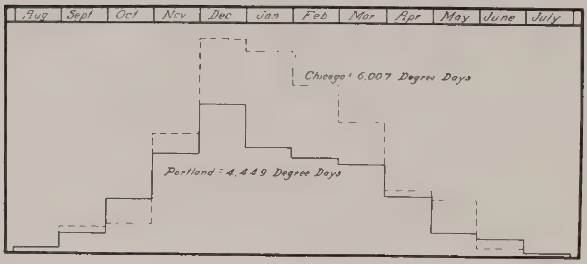

Fig. 6. Chicago Has a Shorter Heating Season Than Portland, Ore., But the Average Demand During the Four Winter Months is Much Greater

Consequently, the greater the quantity of fuel consumed to provide for a square foot of radiation per degree-day. If, then, unit figures for fuel are multiplied by the radiation quantity and by the number of degree-days, the total fuel requirements will be lower than would be the case were the same building located at a place where the base temperature is lower, the number of degree-days higher, and the total radiation greater.

Determinations for other fuels are easily made with the data:

Degree-Days	*Gas, Cubic Feet*[1]	*Coal, Pounds*[2]
1,000	96	8
2,000	192	16
3,000	288	24
4,000	384	32
5,000	480	40
6,000	576	48
7,000	672	56
8,000	768	64
9,000	864	72
10,000	960	80

1. Correction should be made for gas variations:

Heat value assumed to be 1,000 B.t.u. per cubic foot.

Other corrections the same as those for oil fuel.

2. Correction should be made for coal variations:

Heat value of coal assumed to be 12,000 B.t.u. per pound.

Other corrections the same as those for oil.

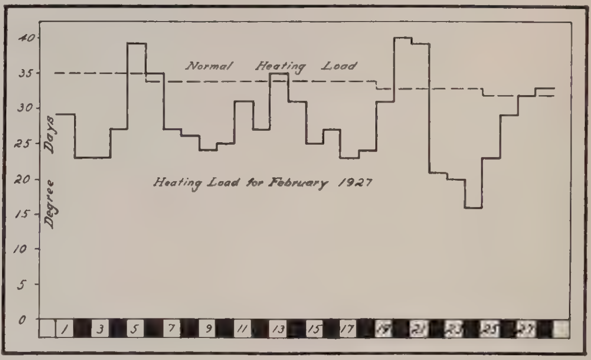

Fig. 7. Graph of an Unusually Mild February in New York. Heating Requirements Were Below Normal on all but Six Days

To indicate the accuracy that can be attained through the use of this method of pre-determining fuel consumption, I might cite a specific case. I was able to obtain exact data regarding the installed radiation in more than 100 homes in Chicago, and for each I computed the gas consumption in terms of cubic feet per square foot of installed radiation, correcting for the heating value of the gas supplied in Chicago,—535 B.t.u. It worked out to be 709.3 cubic feet. Through the courtesy of the local public utility company, I was afforded access to the meter records of the houses under consideration, and the total gas consumed divided by the aggregate radiation was 706.8 cubic feet. Thus the *computed* gas consumption varied from the *actual* consumption by only 1.5 cubic feet, or *less than 0.2 per cent.* This represented an error in the cost of heating these houses of less than $1 per house. Oil burner salesmen and engineers have frequently told me that they had pre-determined oil consumption to within 50 to 100 gallons per heating season where the total consumption was from 2,000 gallons to 4,000 gallons. Thus the method is simple and accurate, and because of its adaptability to graphic presentation, it is eminently suited to the use of architects and engineers. On the page opposite and on the following page will be found a table of the average yearly heating loads, expressed in degree-days, for some 327 cities in the United States and Canada.

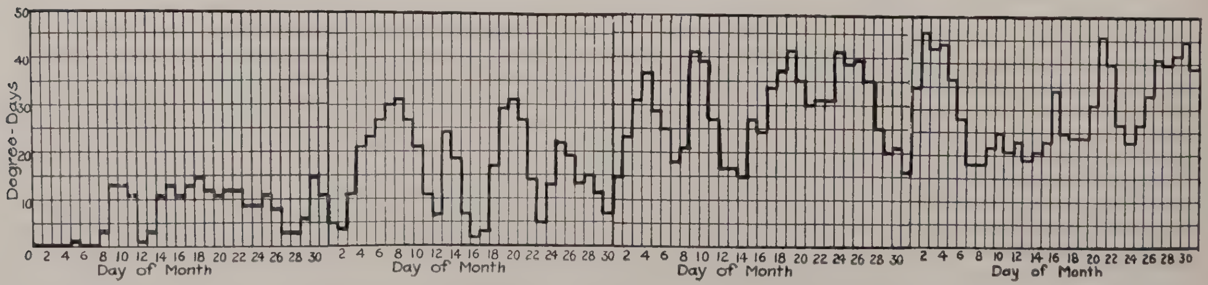

Fig. 8. Monthly Graphs Can be Plotted and Put Together to Show the Yearly Heating Load for Any Locality

HEATING LOADS IN DEGREE-DAYS, CITIES OF UNITED STATES AND CANADA

No.		Degree-Days
	ALABAMA	
1	Birmingham	2527
2	Gadsden	3006
3	Mobile	1439
4	Montgomery	1898
5	Tuscaloosa	2529
	ARIZONA	
6	Bisbee	2706
7	Flagstaff	10913
8	Globe	2575
9	Nogales	2497
10	Parker	1517
11	Phœnix	1446
12	Prescott	5060
	ARKANSAS	
13	Hot Springs	2665
14	Little Rock	2861
	CALIFORNIA	
15	Eureka	5021
16	Fresno	2375
17	Los Angeles	1517
18	Pasadena	2066
19	Sacramento	2525
20	San Diego	1582
21	San Francisco	3450
	COLORADO	
22	Boulder	5665
23	Colorado Springs	10089
24	Denver	5880
25	Fort Collins	6877
26	Grand Junction	5570
27	Leadville	11005
28	Pueblo	5671
29	Telluride	9372
30	Trinidad	5439
	CONNECTICUT	
31	Hartford	6124
32	New Haven	6039
33	New London	6040
34	Waterbury	5661
	DELAWARE	
35	Dover	4539
36	Seaford	4507
37	Wilmington	4813
	DISTRICT OF COLUMBIA	
38	Washington	4562
	FLORIDA	
39	Gainesville	791
40	Jacksonville	1080
41	Lake City	955
42	Orlando	389
43	Pensacola	1288
44	St. Petersburg	175
45	Tallahassee	1421
	GEORGIA	
46	Americus	1862
47	Athens	2691
48	Atlanta	2880
49	Augusta	2173
50	Brunswick	1269
51	Gainesville	3259
52	Macon	2220
53	Rome	3073
54	Savannah	1517
55	Waycross	1470
	IDAHO	
56	Boise	5657
57	Challis	8074
58	Emmett	5587
59	Lewiston	4924
60	Pocatello	6459
61	Salmon	7866
62	Sandpoint	7357
63	Twin Falls	6600
64	Wallace	7228
	ILLINOIS	
65	Aurora	6661
66	Cairo	4053
67	Chicago	6007
68	Decatur	5485
69	Olney	4751
70	Peoria	6146
71	Rockford	6847
72	Springfield	5495
	INDIANA	
73	Evansville	3355
74	Fort Wayne	5927
75	Indianapolis	5331
76	Lafayette	5241
77	Marion	5768
78	Richmond	6060
79	South Bend	6313
80	Terre Haute	4920
	IOWA	
81	Algona	7594
82	Burlington	6261
83	Clinton	6628
84	Des Moines	6464
85	Dubuque	6744
86	Fort Dodge	6753
87	Marshalltown	7103
88	Waterloo	7152
	KANSAS	
89	Dodge City	5035
90	Leavenworth	4795
91	Salina	5030
92	Topeka	5282
93	Wichita	4675
	KENTUCKY	
94	Bowling Green	3883
95	Frankfort	4241
96	Hopkinsville	3846
97	Lexington	5250
98	Louisville	4366
99	Middlesboro	3977
100	Owensboro	4179
	LOUISIANA	
101	Baton Rouge	1206
102	New Orleans	1044
103	Shreveport	2097
	MAINE	
104	Eastport	8676
105	Gardiner	7537
106	Lewiston	7502
107	Portland	7267
	MARYLAND	
108	Annapolis	4482
109	Baltimore	4591
110	Cambridge	4273
111	Frederick	4926
112	Frostburg	5613
113	Salisbury	4223
	MASSACHUSETTS	
114	Boston	6055
115	Lawrence	6682
116	Lowell	6504
117	Springfield	6464
	MICHIGAN	
118	Alpena	8319
119	Big Rapids	7440
120	Calumet	9217
121	Detroit	6202
122	Escanaba	8904
123	Frankfort	7590
124	Grand Rapids	6613
125	Greenville	7037
126	Lansing	6957
127	Ludington	7185
128	Mackinaw	8461
129	Marquette	8866
130	Muskegon	6922
131	Saginaw	7080
132	Sault Ste. Marie	9707

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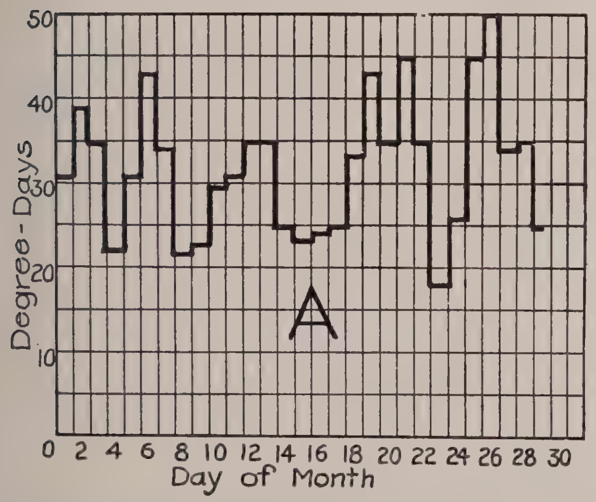
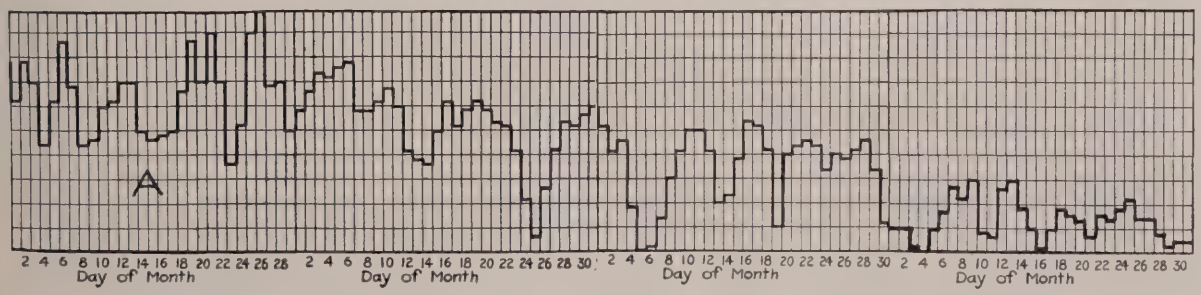


Fig. 9. A Monthly Heating Load Graph in Degree-Days. This Forms Part "A" of the Yearly Graph Shown



Continuation of the Yearly Heating Load Chart Shown on the Opposite Page

HEATING LOADS IN DEGREE-DAYS, CITIES OF UNITED STATES AND CANADA—*Continued*

No.		Degree-Days
	Minnesota	
133	Duluth	9650
134	Minneapolis	7953
135	Moorhead	9495
136	St. Cloud	8687
137	Winona	7515
	Mississippi	
138	Aberdeen	2743
139	Jackson	1920
140	Meridian	2527
141	Natchez	1667
	Missouri	
142	Chillicothe	5017
143	Hannibal	5303
144	Kansas City	5302
145	Kirksville	5799
146	Marshall	5042
147	Poplar Bluff	3914
148	Rolla	4671
149	St. Joseph	5289
150	St. Louis	4583
151	Springfield	4650
	Montana	
152	Anaconda	9158
153	Billings	6983
154	Butte	8262
155	Great Falls	7222
156	Havre	8608
157	Helena	7764
158	Kalispell	8261
159	Missoula	8324
160	Virginia City	8682
161	Yellowstone Park	9723
	Nebraska	
162	Falls City	5197
163	Grand Island	6084
164	Lincoln	6231
165	McCook	5801
166	North Plate	6479
167	Omaha	6127
	Nevada	
168	Eureka	7072
169	Fallon	5676
170	Goldfield	5556
171	Las Vegas	2827
172	Lovelock	5710
173	Reno	5894
174	Tonapah	6069
175	Winnemucca	6266
	New Hampshire	
176	Berlin	8867
177	Concord	7335
178	Franklin	7537
179	Keene	7338
	New Jersey	
180	Asbury Park	5390
181	Atlantic City	5250
182	Cape May City	4821
183	Long Branch	5393
184	Trenton	5033
	New Mexico	
185	Albuquerque	4401
186	Cimarron	5872
187	Raton	5930
188	Roswell	3399
189	Santa Fe	6064
	New York	
190	Albany	6542
191	Amsterdam	7494
192	Binghamton	6882
193	Buffalo	6750
194	Elmira	6041
195	Ithaca	6917
196	Jamestown	6740
197	Lockport	6802
198	New York	5303
199	Norwich	7321
200	Ogdensburg	7592
201	Port Jervis	6310
202	Rochester	6834
203	Syracuse	7269
204	Watertown	7396
	North Carolina	
205	Asheville	4410
206	Charlotte	3153
207	Newbern	2580
208	Raleigh	3287
209	Wilmington	2493
210	Winston-Salem	3904
	North Dakota	
211	Bismarck	8498
212	Grand Forks	9724
213	Jamestown	8825
214	Minot	9591
	Ohio	
215	Akron	6188
216	Cincinnati	5302
217	Cleveland	6096
218	Columbus	5426
219	Dayton	5341
220	Ironton	4636
221	Lima	6051
222	Sandusky	5998
223	Toledo	6107
	Oklahoma	
224	Ardmore	2374
225	Guthrie	3388
226	Oklahoma City	3827
227	Tulsa	3497
	Oregon	
228	Doraville	5527
229	Eugene	5588
230	Marshfield	4989
231	Pendleton	5148
232	Portland	4449
233	Salem	4629
	Pennsylvania	
234	Altoona	6115
235	Clearfield	5994
236	Harrisburg	5529
237	Huntington	5771
238	Lancaster	5508
239	New Castle	5932
240	Philadelphia	4950
241	Pittsburgh	5327
242	Reading	5487
243	Scranton	6197
244	York	5423
	Rhode Island	
245	Block Island	5803
246	Providence	6111
	South Carolina	
247	Aiken	2280
248	Charleston	1770
250	Florence	2493
	South Dakota	
251	Aberdeen	8709
252	Pierre	7213
253	Sioux Falls	7683
254	Yankton	7337
	Tennessee	
255	Chattanooga	3099
256	Jackson	3261
257	Johnson City	3950
258	Knoxville	3517
259	Nashville	3550
260	Perryville	3414
	Texas	
261	Abilene	2610
262	Amarillo	4655
263	Austin	1578
264	Brownsville	319
265	Corpus Christi	886
266	Dallas	2455
267	El Paso	1912
268	Galveston	1050
269	San Antonio	1362
270	Waco	1838
	Utah	
271	Logan	6750
272	Manti	6826
273	Ogden	5848
274	Provo	6184
275	Salt Lake City	5358
	Vermont	
276	Burlington	8123
277	St. Johnsbury	8176
	Virginia	
278	Cape Henry	3478
279	Danville	3316
280	Lynchburg	3849
281	Richmond	3789
282	Roanoke	4164
283	Staunton	4535
	Washington	
284	Aberdeen	5325
285	Bellingham	5994
286	Everett	5480
287	Lind	5790
288	Seattle	5156
289	Spokane	6085
290	Tacoma	5218
291	Walla Walla	4694
292	Yakima	5540
	West Virginia	
293	Charleston	3789
294	Elkins	5813
295	Huntington	4722
296	Parkersburg	4884
297	Wheeling	5214
	Wisconsin	
298	Ashland	9066
299	Beloit	6938
300	Eau Claire	7973
301	Green Bay	8201
302	LaCrosse	7309
303	Madison	7251
304	Milwaukee	7366
305	Oshkosh	7508
306	Prentice	8765
307	Sheboygan	7384
308	Wisconsin Rapids	8030
	Wyoming	
309	Cheyenne	7360
310	Cody	7769
311	Laramie	8814
312	Rawlins	8080
313	Sheridan	8113
314	Thermopolis	7489
	Canada	
315	Victoria, B. C.	5777
316	Vancouver, B. C.	5976
317	Kamloop, B. C.	6724
318	Medicine Hat, Alb.	8152
319	QuAppelle, Sask.	11261
320	Winnipeg, Man.	11166
321	Port Arthur, Ont.	10803
322	Toronto, Ont.	7732
323	Montreal, Que.	8705
324	Quebec, Que.	8628
325	Frederickton, N. B.	9099
326	Yarmouth, N. S.	7694
327	Charlottetown, P.E.I.	8485

THE CLIENT, THE ARCHITECT AND THE CONTRACTOR

PART III—THE CONTRACTOR

BY

CLINTON H. BLAKE

IN the two preceding articles of the present series, we have discussed successively the problems and attitude of the architect and the problems and attitude of the owner. It remains now to consider the contractor. No building operation can be carried to a successful, happy and effective conclusion unless the rights, liabilities and point of view of the contractor are looked at in their proper perspective, and are appreciated and understood. The good will and bona fide coöperation of the contractor are just as necessary as the bank account of the owner and the ability and services of the architect.

It may be said in general that the contractor's relations to the project are three-fold,—his relations to the owner, his relations to the architect, and his relations to his subcontractors, employes and material men, as the case may be. The relations between the contractor and the owner are primarily those of one business man to another. So long as each of them is honest and capable and fair-minded, it is probable that there will not be any disagreements or difficulties. The owner is usually a business man, and between him and the contractor there are not the same possibilities for misunderstanding as in those which are inherent in the relations between owner and architect.

The relations between the contractor and the owner will be affected somewhat by the nature of the contract. If it is a cost-plus contract, considerations will arise which will not be involved in a fixed-price contract, and vice versa. It is fair to say, I think, that on a cost-plus contract the owner usually feels that the contractor will probably not injure himself in his efforts to keep down the cost. This feeling results, perhaps, from business cynicism. It comes probably more, however, from the fact that in some cases contractors undoubtedly are not very careful as to expenses in cost-plus work,—at least within the limits set up by the maximum cost guarantee,—if such a provision be included in the contract. It is, of course, unjust for any owner to feel that contractors in general are unwilling to give him as conscientious service on a cost-plus as on a fixed-price contract. Given a thoroughly honest and conscientious contractor, the owner will in many cases fare better on a cost-plus arrangement than where the contractor is forced to put in a fixed bid and, in so doing, naturally discounts various possibilities for loss and adds sufficient margin to cover them. On the other hand, there is no doubt that contractors in some cases have taken advantage of owners on cost-plus work, and that, even without any bad faith on the part of the contractor, the work on these projects has not been speeded up by those in direct charge, as it would have been, had the work been carried on for a fixed fee.

While it may seem paradoxical, it is the fact, nevertheless, that the feeling of suspicion held by many owners as to cost-plus work may be turned to distinct advantage by honest and capable contractors. The owner who expects to be taken advantage of on a contract of this kind will be the first to react favorably when he finds that the contractor is giving him a square deal and doing his best to save him money. The contractor who does this will make a firm friend of such an owner and receive from him free advertising worth many times the additional compensation which the contractor might have received if he had not handled the work as conscientiously as he did. Many of the larger building concerns are fully alive to this situation and have built up and are building up day by day an extraordinarily valuable good will by the simple process of pleasantly surprising their clients in the results secured.

Where the contract is on a fixed-price basis, the situation is changed. Under these conditions, the contractor will not have any incentive to delay the work or add to the cost, but rather to expedite it and keep down the cost as much as possible. In this case the suspicious owner is looking, therefore, for skimped work rather than unnecessary work. There is introduced under this form of contract, also, a new element and one which may be very troublesome,—namely, the matter of extras. There is nothing which will more quickly and completely wreck the good will existing between the contractor and the owner than claims for extra work not covered by the original contract. Even where these claims are bona fide, the owner will many times feel that they are unfair and that they should have been covered by the contract price. It is in the interests of a sound and permanent understanding between the parties that the contract in the first instance be as complete as possible. It is never possible completely to avoid extras; at least, I do not now remember any instance where some extras were not necessarily involved. There is no doubt, also, that some unscrupulous contractors make it their practice to put in low bids and make up their profit in the form of extras. If the contract and specifications are not carefully worded, the contractor is often presented with an excellent opportunity to do this and still be within his strict legal rights. The result will mean additional profit for him on that particular contract, but it will not aid him in building up the good will and prestige which are, in the long run, of vastly more advantage to him. On the other hand, it is no less true that the owner in many cases is entirely unreasonable as to extras which are properly claimed. It is also true that the honest contractor often loses a contract to a more unscrupulous competitor, because the latter has under-bid him, trusting to extra claims to offset the difference.

The architect can be of special service to both the contractor and the owner in meeting this situation. By his experience he is far better fitted than the owner to foresee the difficulties ahead and to prevent them so far as possible. One of the greatest services which he can render to the owner and to the high-class contractor alike is to make the specifications and contract so definite and comprehensive in the first instance that extras are, so far as possible, eliminated. Where this is done, it is correspondingly difficult for the unscrupulous contractor to take advantage of the situation and unfairly to under-bid his honest competitors. The reduction in the number of extra items works a corresponding reduction in the opportunities for misunderstanding and dispute. As a matter of sound business, therefore, as well as a matter of sound ethics, the contractor will do well to coöperate in seeing that the specifications and contract cover as nearly as is practical all of the work required for the completion of the work and that the possibilities of extras are reduced to a minimum. Where the contract is not complete in this respect, and extra work is made necessary, the contractor is, of course, entitled to be paid for it and to stand upon his rights in this respect. He will find it distinctly to his interest, however, in the long run to so handle the situation as to make clear to the owner his desire to be fair and to remove any suspicions that he is claiming, in the guise of extras, any additional payments to which he is not fairly entitled. A contractor whose attitude is obviously fair and liberal in this respect will be the contractor to whom the architect and the owner will give preference in future work.

I have had an excellent illustration of this within the last few weeks. About a year ago, an owner employed a contractor with whom he had not theretofore dealt. The project was not easy, as it involved alterations and was, therefore, peculiarly adapted to "extra" claims. The contractor proceeded with the work promptly and efficiently. There were many items where the owner rather expected that extras would be asked and for which indeed he was prepared to pay reasonable costs. The contractor knew of the owner's attitude and knew that if he put in a claim for extras it would be honored. He nevertheless voluntarily disregarded this opportunity and included ed many of these items in the contract price. The result was that the owner was tremendously pleased and that he became a real and enthusiastic "booster" for this particular contractor. Within recent months the same owner has had another project on which bids were submitted by many high-class contracting firms. Some of them were lower than the bid submitted by the contractor who had done the previous work. There was no reason to think that the lower bidders were not responsible and conscientious. The owner, however, did not hesitate for a moment, but promptly reëmployed the same contractor, giving him a contract several thousand dollars higher than the contract which he could have secured from others. The additional profit which the contractor will secure in all probability under this second contract will amount to far more than the aggregate amount of the extras which he might have secured, had he so wished, on the first project. This is a typical and practical example of the investment value of convincing the owner that he will have fair treatment, few extras, and real coöperation in keeping the cost within his limits.

Another situation with which the contractor is often confronted is that in which the contract drawings or specifications, through carelessness, mistake or otherwise, do not properly provide for the work. This situation is often, but not necessarily, related to the question of extras. However that may be, there is no question but that the duty of the contractor is to bring to the attention of the architect or the owner the discrepancies or mistakes involved. It will probably be more tactful for him to bring them to the attention of the architect in the first instance. This will give the architect an opportunity to correct them himself and will not give him the feeling that the contractor has been officious or has gone over the head of the architect in taking up the matter with the owner. If it is not possible or practical to consult the architect to have the corrections made in this way, it is then the duty certainly of the contractor to consult the owner. By saying that this is a duty, I do not mean that it is necessarily a legal duty. It is clearly, however, the right course for him to follow. More than this, it is distinctly the course most to his advantage. If the contractor, knowing that omissions have been made, inadvertently proceeds with the work and, when the situation later develops, demands extras for the changes or additional work resulting from them, he will secure some temporary benefit undoubtedly from the extra allowance. The architect will usually feel, however, that he should have been consulted, and the owner will feel that someone is to blame and will probably place the blame upon both the architect and the contractor.

Some contractors incur criticisms by subletting practically the entire work and then losing interest in it, being assured that they are protected under their subcontracts.

This is an especially aggravating situation from the point of view of both the owner and the architect. If the general contractor undertakes the work, the owner is entitled to look to him as the responsible party and to expect him to give it real attention. There are many contractors, without doubt, however, who in the true sense of the word are not engaged in building operations themselves, but who merely take contracts, sublet all the work, and include a profit for themselves. Architects are not partial to contracting organizations of this character. They feel, and rightly, that the contractor who takes an active part in the building work through his own organization, will give fair attention and far better coöperation. Even if, in a given case, the contractor sublets the greater part or all of the work, he will do well, in the interests of the good will of the architect and the owner, to evince a continuing and effective interest in the work done and a proper supervision of his subcontractors and material men.

The attitude of the contractor toward the architect is usually very complimentary to the latter. The contractor is either suspicious of the architect and his abilities or he follows the other extreme in his reliance upon him. In the great majority of cases, the contractor's inclination is to rely upon the architect to protect him and see that is is not taken advantage of under the contract. It is natural that the contractor should have a very definite feeling of either trust or distrust toward the architects with whom he works. The architect is in a position to be of great help to the contractor or to cause him considerable difficulty and loss. If the architect is unfair or not capable or experienced, he can very easily cause the contractor to lose his expected profit and considerably more, in addition. On the other hand, if, as is usually the case, he is experienced and conscientious and capable, he can be of great assistance to the contractor in interpreting the latter's attitude to the owner and the owner's attitude to the contractor, in promoting a harmonious handling of the operation and in protecting the rights of the contractor where it is proper and necessary that he should do so. We have noted briefly in another connection the position of the architect as arbitrator. His powers as such have many ramifications. The architect does not always himself realize how often and on how many questions he is called upon to decide judicially between the owner and the contractor. Many of these decisions are made casually and accepted without question by the parties concerned. Some of them are more formal and difficult. The architect again and again is called upon to hold the scales as between his client and the contractor and to do justice between them. This may be in connection with his interpretation of the drawings and specifications; it may be in connection with the condemnation of work or the issuance of certificates or the approval of extras.

So far as the contractor is concerned, it is a practical necessity that he should rely, whether he wishes to or not, upon the ability and good faith of the architect. The status of the architect is necessarily such that, in order to make his employment and work effective, he must be and is endowed with powers which, if improperly exercised, would be very harmful to the contractors. This has been recognized as a necessary condition. The tendency for some years has been to cut down somewhat the power of the architect in this connection and to limit his purely discretionary and arbitrary powers and throw open the door to arbitration on various points, which formerly might have come to him for sole decision. There remains, however, sufficient discretionary power in his hands, so that the contractor has a real interest in the choice of the architect. If the architect does not know his business or is not sound in his practice and sensible in the conduct of the work, the contractor would much better not undertake the contract. On the other hand, if the architect is experienced, fair and reasonable and has a reputation for doing the right thing by contractor and client, the contractor is reasonably safe in entering upon the work, even if the contract gives wide discretionary powers to the architect.

In the last analysis, the contractor must depend, and does depend, upon the good faith, fairness and ability of the architect. That there are very few cases in which any objection is made to the architect by the contractor indicates how well this dependence is justified and is a real compliment to the architectural profession. A wise contractor will argue the terms of the contract before it is signed, and not afterwards. If there is any question which is not entirely clear or if any ambiguous provisions are inserted or if there are some points which are not covered, he will bring these to the attention of the architect or the owner, before the contract is signed. It is true that many contractors are not diligent in this respect and that some even knowingly enter into ambiguous contracts with the thought that the ambiguities may result in benefit to them, in promoting opportunities for extras and in making possible additional compensation and claims. This is undoubtedly the result in some cases. In the long run, however, the contractor who does his talking and arguing beforehand and not afterwards is the one who will succeed and build up real prestige. No owner and no architect care to deal many times with a contractor who is constantly wrangling over the terms of his employment and their interpretations. They much prefer to deal with one who may be a shrewd bidder and, if one will, “fussy” in the framing of the contract in the first instance, but who stands by it and by its terms and by the architect's interpretation of it, after it has become effective.

There is some misapprehension in the minds of contractors with regard to their authority in emergencies. Some have the idea that in any emergency they are authorized to act on their own initiative. This is not necessarily true and is not a safe rule for them to follow. If an emergency arises where there is no possibility of consulting the owner or the architect, the contractor necessarily must act as he thinks best and necessary. On the other hand, if the emergency is not so acute and if it is possible to consult the owner or architect, this should be done. It should be done, not only in the interest of the owner, but in the interest especially of the contractor.

The contractor will do well, also, to have in mind the limits of the architect's authority in the matter of changes and the authorizing of extras. It is natural that where the architect gives definite, verbal directions regarding the work, the contractor should follow it. Such directions are given constantly and constantly obeyed without any unfortunate results. This is because, however, the owner, in effect ratifies the action of the architect and raises no question regarding it. I have already pointed out some of the limitations of the architect's authority as an agent. The contractor is interested in these limitations, fully as much as the architect or the owner. In fact, his interest is probably greater. If he proceeds with work and incurs expense on a verbal authorization, which the architect has no power to give, and in which the owner does not back up the architect, the contractor will face a serious loss in consequence. Wherever possible, the contractor will do well to have these directions of the architect confirmed in writing and, if the directions are such as to entail substantial changes or additions in the contract, he will do well to ask that they be confirmed in writing by the owner. Of course, if the construction contract provides that the contractor may honor any directions given by the architect for changes or additions, this latter precaution may not be necessary. The contract provides, more often, however, that such changes shall be approved in writing by the owner. The clauses in the contract dealing with this point are of vital interest to the contractor and should be borne in mind by him, especially in negotiating and executing the agreement.

On the whole, the architect and the contractor probably understand each other better than do the owner and architect or the contractor and owner. The contractor, from long association with architects, appreciates the position which they occupy in the building world and their functions and limitations. The architect, from his association with builders, understands the problems which confront the contractor and, without any lessening of his loyalty to his client, is able to take a sympathetic view of many of the contractor's difficulties. The owner and contractor and the owner and architect have direct contractual relations. There are no such relations between the architect and the contractor. This, perhaps, is one reason why there are fewer serious misunderstandings between them. On any building project, coöperation is the real essential. The architect and owner can do little without the coöperation of the contractor. The contractor needs their coöperation. In some cases it will be lacking because one of the parties is inclined to be unfair or unreasonable. In a great majority of cases, however, if lacking, it will be absent because of a lack of understanding on the part of architect, owner or contractor. As I indicated at the commencement of these articles, this understanding is the real essential. The architect is in an excellent position to promote mutual understanding. He can interpret the contractor's position and problems to the owner and he can interpret the problems and point of view of the owner to the contractor. In so doing, he will not render a general service alone. He will be making smooth, also, his own path, diminishing the chances of friction and misunderstanding on the work, increasing the prospect that his client will be wholly satisfied, and strengthening the foundation upon which the permanence of his own prestige and the good will of his practice and organization depend. The American Institute of Architects has, as an organization, done valuable work along these very lines. Its standard forms of agreements alone are a considerable accomplishment. It is not an easy matter to draft a contract which is satisfactory and fair to owner and architect and contractor alike. The Institute and similar architectural associations may well take pride in the part which they have played, and are playing to an increasing extent, in eliminating misunderstandings and points of friction and promoting coöperation and good will and understanding throughout the building operation.

AERIAL DRAFTING

BY

H. G. HALL

THIS title does not refer, as might be supposed, to the familiar publicity method commonly called "sky writing," but refers to the pictorial presentation of objects as viewed from the air. The increasing airmindedness and the increasing familiarity of the general public with the appearance of the ground and of objects on the ground as viewed from airplanes, raise a question as to the best method of making and presenting perspective drawings, giving what used to be called "bird's-eye" views. This question is of timely interest to architects, as the very same developments which have made accurate presentation more important have also increased materially the general usefulness of air views of great varieties of subjects, — towns, cities, housing developments, buildings, groups of buildings, airports, to mention a few.

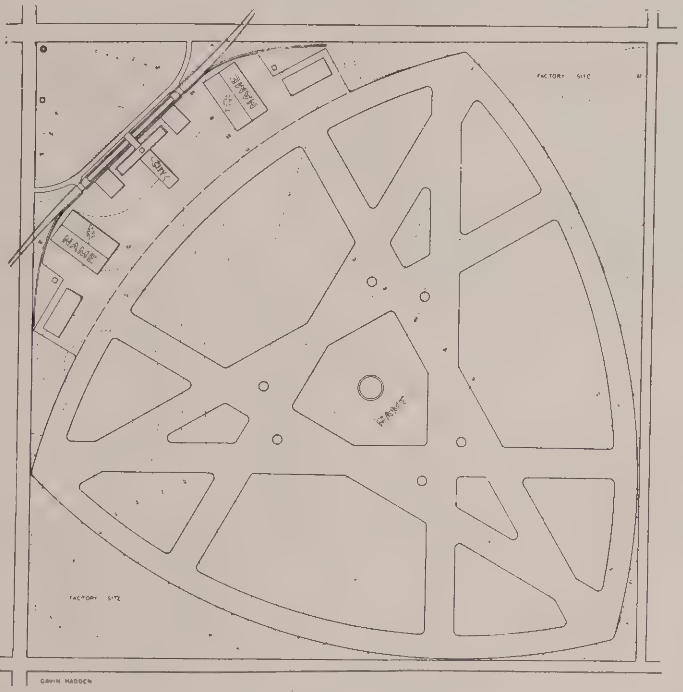


Fig. 1. Plan of the Airport Shown in the Perspectives, Figs. 2 and 3

The methods universally used for making perspective projections from plans or maps require projection of the subject upon a vertical picture plane. These methods produce satisfactory results in all usual cases when the viewpoint is close to the ground, or when the picture plane is nearly perpendicular to the line joining its center with the viewpoint, because the objects are thus pictured in substantially the same proportions and relations as if viewed by the eye or recorded by the camera. When, however, objects are seen or recorded from a viewpoint at a great distance above the ground, the retina of the eye and the plate of the camera are usually tilted far from the vertical, and the perspective drawing of the same view, projected on a vertical picture plane, seems to show serious distortion. Increasing familiarity with airplane views increases the seriousness of this distortion, and although a true view can be obtained of such perspective drawings by tilting them to the proper angle to the line of sight, it is quite impossible to expect this to be done by the usual reader.

Another method sometimes employed in making perspective drawings of objects covering large horizontal areas consists of photographing the plan at the desired angle, thus securing directly the desired perspective projection of the plan, and then sketching in on the photograph all lines of the picture which lie outside of this plane. By this method, however, it is impossible to obtain accurate representation of any of the objects portrayed except only those portions which lie in the plane of the plan, i.e. horizontal.

Without the use of the camera it would, of course, be entirely impracticable to project a drawing on a picture plane which is not vertical. While it would be possible to do so, the labor involved in calculating a different proportion for the projection of each point would be prohibitive. It is, however, a comparatively simple matter to make the drawing in the usual manner, projecting it on a vertical picture plane, and then to correct the distortion by photographing the original drawing tilted so as to form the proper angle with the camera plate, or vice versa. The resulting photograph when viewed directly will show the picture as it would be seen from the air.

The illustrations accompanying this article show how this method has been carried out with a perspective drawing of an airport. Fig. 1 shows a plan drawing of the airport design, with landing field, runways, buildings, etc., in simple outline. Fig. 2 shows the perspective drawing of this airport, projected in the usual manner from the plan to a vertical picture plane and repro-

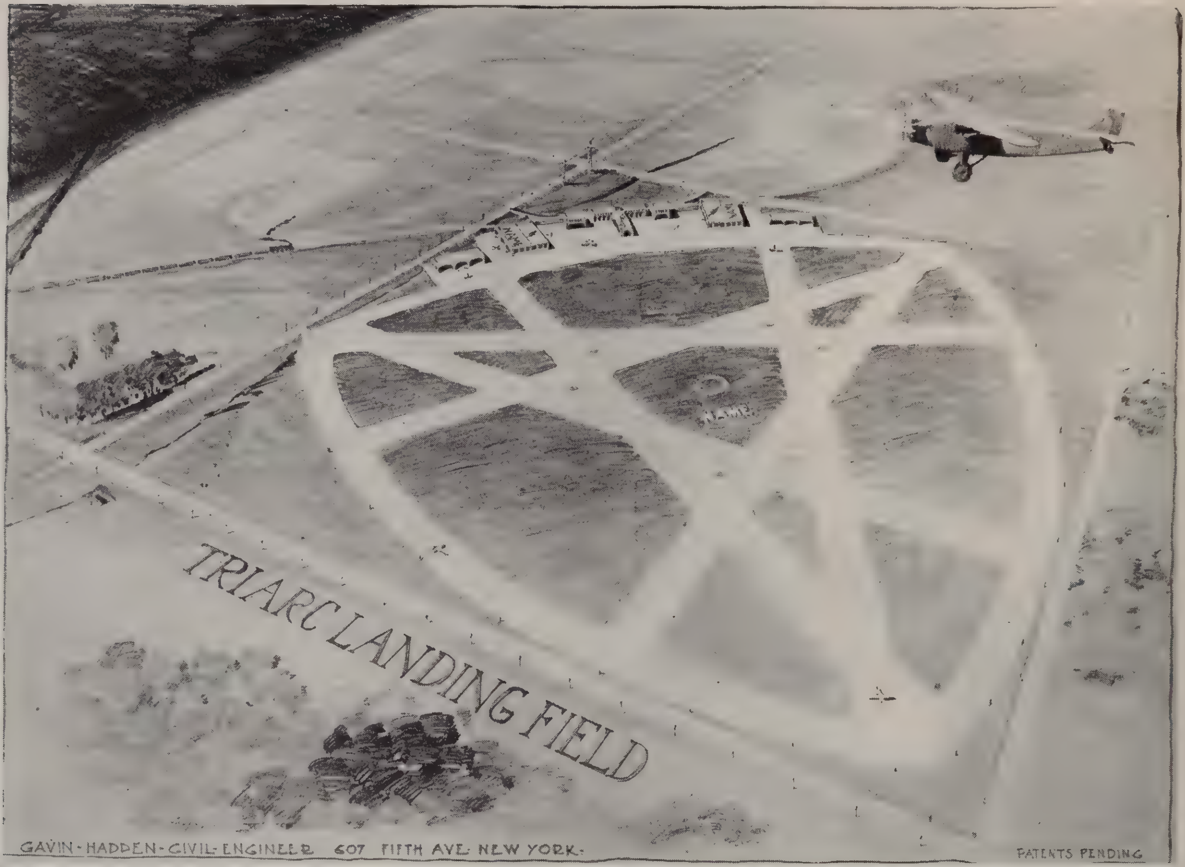

TRIARC LANDING FIELD
NAME
GAVIN-HADDEN-CIVIL-ENGINEER 607 FIFTH AVE NEW YORK
PATENTS PENDING

Fig. 2. Usual Aërial Perspective, Showing Apparent Distortion

duced from a normal photograph. The apparent distortion is quite obvious, particularly when it is realized that the site enclosed by the four boundary roads is almost exactly square and that the landing field and its runways have complete triangular symmetry, as is shown clearly in the plan. To get a true view of this picture, the illustration must be held at the proper distance from the eye and at an angle of about 57 degrees with the line joining the center with the eye. Fig. 3 shows the same perspective drawing, reproduced, however, from a photograph taken with the drawing tilted at an angle of about 33 degrees from the plane of the camera plate. The distortion has been corrected, and when viewed directly the airport now appears in its proper proportions. The diagrams in Figs. 4, 5, and 6 show the method which was followed. Fig. 4 shows the relation between the airport, the viewpoint, and the vertical picture plane as assumed in making the original perspective drawing. Fig. 5 shows the relation between the airport, the camera lens, and the tilted camera plate as they would be placed in taking a similar picture from the air. The angle between the picture plane of Fig. 4 and the camera plate of Fig. 5 gives the angle to which the drawing was tilted in relation to the camera plate when photographed to correct

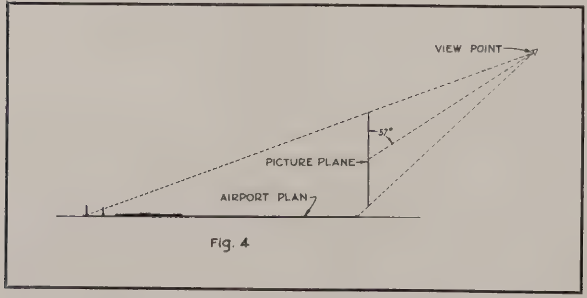


Fig. 4. Diagram of Relation of Plan, Picture Plane and Viewpoint Used for Fig. 2

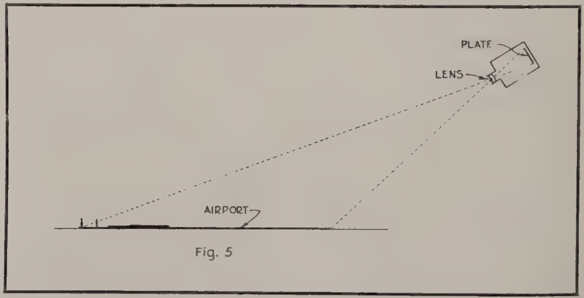


Fig. 5. Diagram of Relation of Plan to Picture Plane When Photographing From the Air

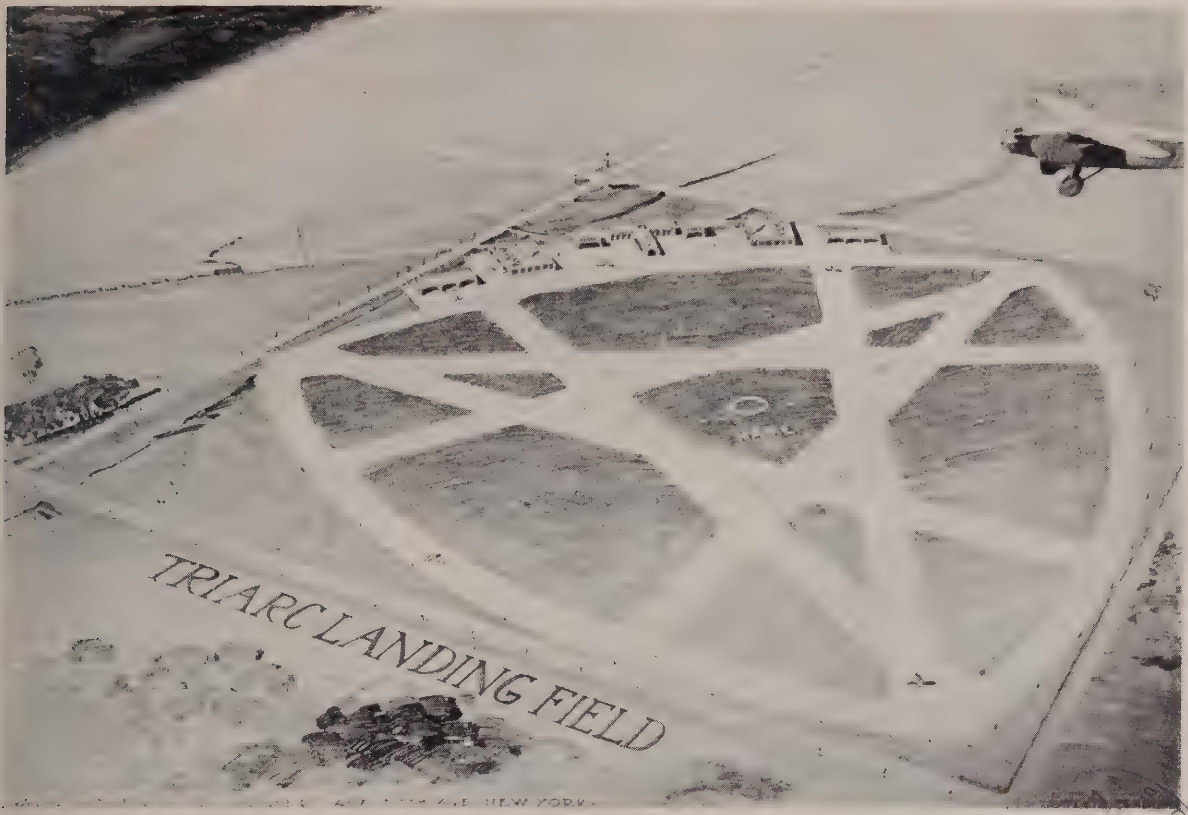


Fig. 3. Aërial Perspective Photographed, as Explained, to Correct Distortion

the distortion, as shown in Fig. 6. This angle was in this particular instance about 33 degrees.

No special camera or apparatus was used in photographing this drawing, and therefore parts of the photograph reproduced in Fig. 3 are slightly out of focus, as can be seen from careful inspection and comparison with the illustration from the normal photograph. The lower and nearer portions of the picture are given in sharp definition, while the upper and farther portions are slightly out of focus. Although sharp definition throughout could readily be obtained if the camera were especially equipped for the purpose, using perhaps a pinhole lens, there is no disadvantage in this case, and the slight loss of sharp definition perhaps makes the view even more interesting and realistic; in a real view, the edge of the wing cutting off the upper left hand corner of the picture, and the fast-moving plane in the upper right hand corner would naturally be out of focus, while a hazy atmosphere would naturally cause a slight blurring of the more distant parts of the view. The principal features of the picture, which is particularly well suited for bringing out the distortion produced by the usual methods, include a new type of landing field and a new system of runways which show the most efficient and economical method of development on a square or nearly square airport site. The maximum lengths of runways are obtained with the minimum amount of runway surfacing, due to the intersections.

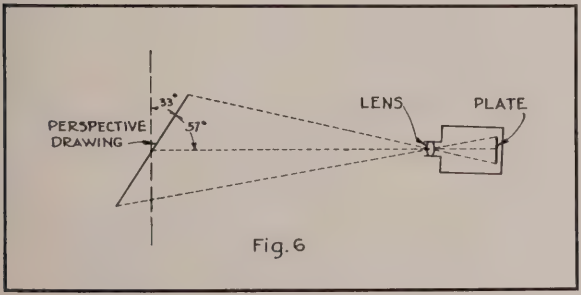


Fig. 6. Relation of Perspective Drawing to Plate to Make Correction Shown in Fig. 3

Editor's Note. *The perspective drawing used to illustrate this method of corrected drafting was made in the office of Gavin Hadden, Civil Engineer, New York. It was rendered by Floyd Yewell, and the photographic work was done by J. Dreyer under the direction of C. A. Holden, of Mr. Hadden's office.*

THE BUILDING SITUATION

A MONTHLY REVIEW OF COSTS AND CONDITIONS

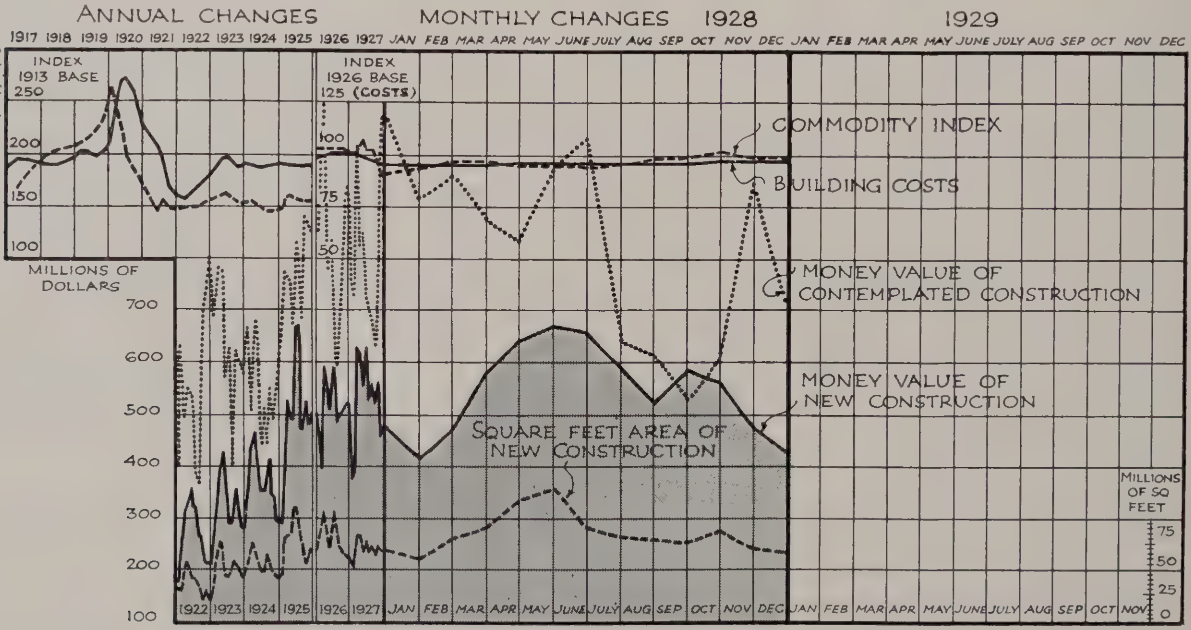
DECEMBER, 1928 brought to a close the high record year in the history of the country's building construction, according to the reports of the F. W. Dodge Corporation. Figures covering contracts let during the year in the 37 states east of the Rockies, which constitute 91 per cent of the active construction area in the United States, show a total value of $6,628,286,100. This figure exceeds that of the previous year by approximately 5 per cent and is 4 per cent above the 1926 figures, the previous high record.

This record for the year 1928 was attained in spite of a fairly decided falling off of contracts let during December. The total for this month was reported as $432,756,300, which was 8 per cent below the total for November and 9 per cent below that of December, 1927. The district which includes New York and also northern New Jersey is the only one in which the December, 1928 record exceeds those of both the previous month and December, 1927. The total contract figures for this district amounted to $138,340,700, an increase of 2 per cent over the previous month and 7 per cent over December of 1927.

In the Northwest the sharpest decline of any section was noticeable. The December, 1928 total was 34 per cent below that of November, and 74 per cent below the previous December. In the Central West, contracts fell off 27 per cent from December, 1927, and 11 per cent from November, 1928. In the New England states, the total contracts let amounted to $28,222,900, which was 8 per cent below the value for November and 9 per cent below that month in 1927.

The chart below indicates that the money value, and also square foot area of construction contracted for during December, are about on a par with the low points for the year. The contemplated construction is somewhat below the average for the year, but considerably above the low points reached during the last half of the year.

It will be noted that in portraying building cost trends in this chart, the year 1926 has been adopted for the index base. This constitutes a more logical "normal" than did 1913, inasmuch as it is more nearly typical of the present economic era and is being generally adopted by economists as the key year for indexing purposes. The commodity index is that developed by *The Analyst,* a source of reliable data on building.



THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Corp. and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the left of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the right of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined, first by the trend of building costs, and second, by the quality of construction.

SANITARY DESIGN IN MODERN BUILDINGS

MISCELLANEOUS SERVICES

BY

HAROLD L. ALT

CLOSELY associated with the cold water supply are the fire-protection or standpipe service, to which all fire hose is connected, and the automatic sprinkler system,—if any. There is considerable variation in practice concerning the location of standpipes, various fire departments having different ideas. Where smoke or fire towers are built into a building, there are usually 2½-inch firemen's valves placed in the towers from standpipes located somewhere near the towers, and 1½-inch hose outlets and hose are placed in the corridors. In other cases it may be permitted to eliminate the 2½-inch valves in the fire towers and to install 2½-inch valves at the hose racks and removable reducers to come down to the 1½-inch size of hose.

Standpipes. In theory, standpipes in a building are for two puposes only,—the first, for the emergency use by the building occupants before the arrival of the firemen, and the second, for the use of the fire department. The number of standpipes should be sufficient for reaching any part of the building with a hose not exceeding 50 feet in length and not over 1½ inches in diameter. Hose racks having 75-foot and 100-foot lengths of hose are sometimes used, but these are poor in practice as everyone who has seen the occupants or even the operating force of a building actually try to use a fire hose in a real fire will agree. Such a fire generally flares up suddenly and unexpectedly; a commotion ensues, everyone becomes excited, the hose is pulled off the rack where it has probably been packed tightly for months, it falls in kinks and is only partially straightened out; some of the many kinks remain, water is turned on at the valve, but the nozzle remains dry. Finally the last kinks are straightened out and water flows, but much valuable time has been lost at the most critical time. The longer the hose, the more kinks there are to be straightened out and the more difficult it is for inexperienced users to handle it. Hence the recommendation of the 50-foot length. This does not mean, however, that the distance from the standpipe to the farthest part of the building must not exceed 50 feet, as the length of the stream from the hose must also be considered, so that it may be said a 50-foot hose will cover a distance of 70 feet from the standpipe provided that the last 20 feet are in a straight line. The hose may be run around a corner, but

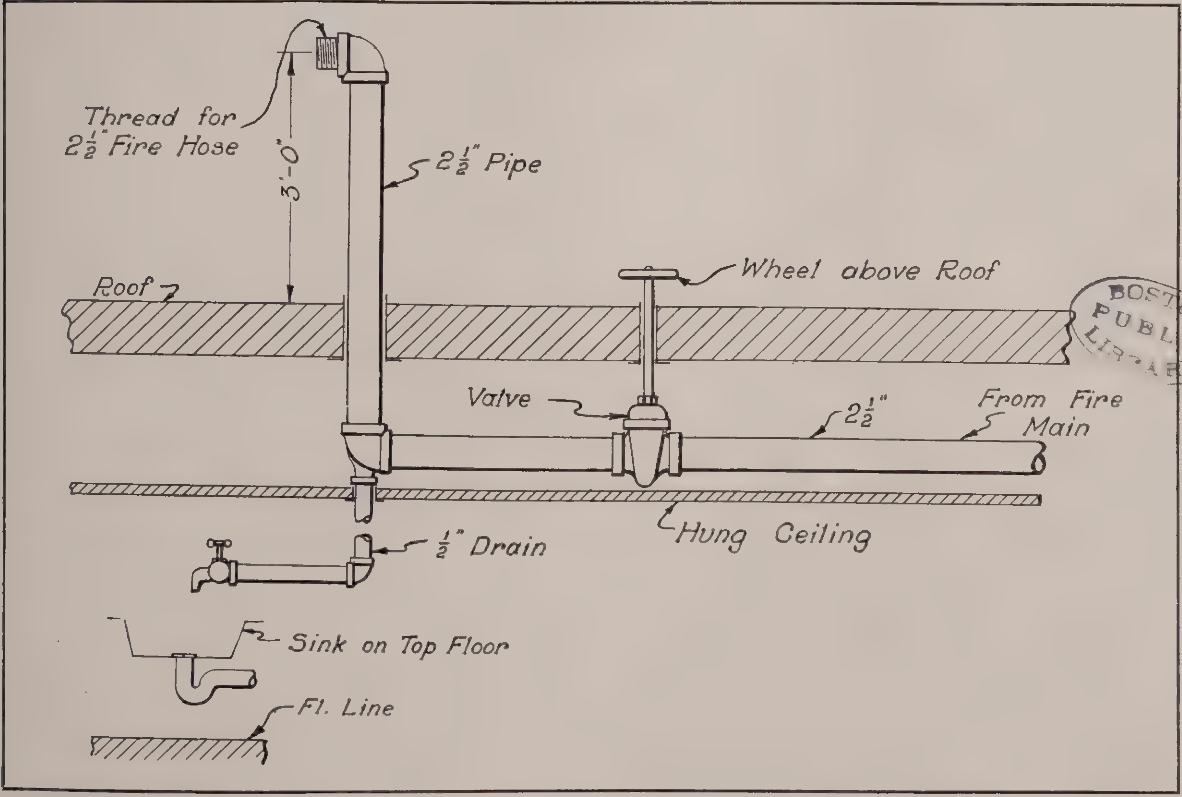


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Fig. 1. Detail of Typical Roof Outlet, Valve and Drain

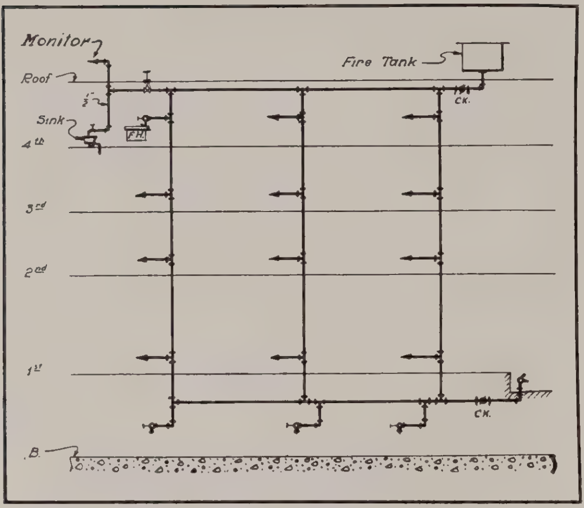

Fig. 2. Layout of a Typical Standpipe System

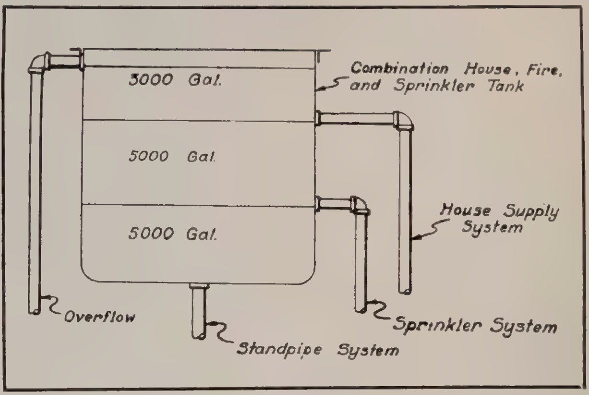

Fig. 3. Combination House Tank Connections

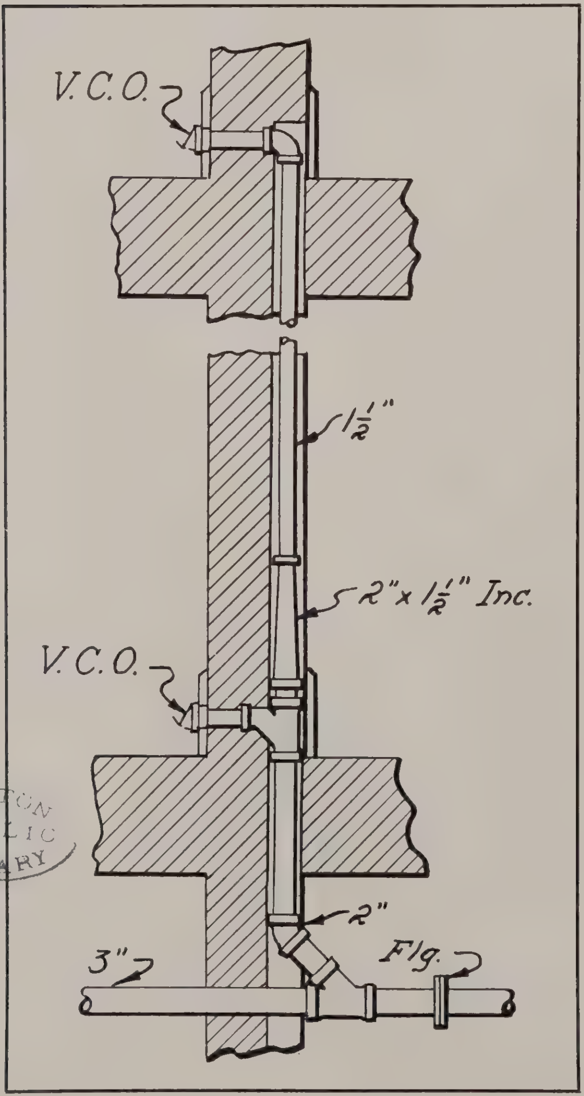

Fig. 4. Connections for a Typical Central System Vacuum Cleaning Installation.

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the stream from the nozzle on does not possess this desirable feature. The law or building code usually sets minimum requirements in regard to the standpipe provisions.

In order to provide an emergency supply of water for the use of the hose by the occupants, a connection to the street main or to the house tank or both is made from the standpipes, and, where the top of the building is above the height of effective city pressure, the house tank connection must be made; only in this case the house tank is either a separate fire tank for fire use only, or else it is combined with the house tank so as to reserve a certain amount of water for standpipe service, this amount usually being between 3,000 and 5,000 gallons. When a separate fire tank is used, it is filled either by city pressure or by pumping, and it has a bottom connection which is run into a horizontal main which connects into the tops of all the standpipes, with a check valve close to the tank, the use of which will be explained later. The street connection is made in a similar manner through a check, but to the bottoms of the standpipes. The object of this is to supply the hose as far up as the city pressure will reach in case the tank reserve should be exhausted.

For the use of the fire department a Siamese connection is installed at the sidewalk, having two 2½-inch connections and a 4-inch outlet to a 4-inch line which also connects through a 4-inch check valve to the bottom of the standpipe. The fire engines are coupled up to the Siamese, and the fire engine pressure is delivered direct into the standpipes. It is to prevent this pressure (which is higher than that of the fire tank and the city system) from backing up into the tank or out into the city mains that the checks on the house tank and city connection previously mentioned are used. Hose of regular 2½-inch size is then taken up into the building by the firemen and coupled to the standpipes at the floor levels where the fire is to be attacked. Owing to the fact that 2½-inch hose under high pressure requires expert

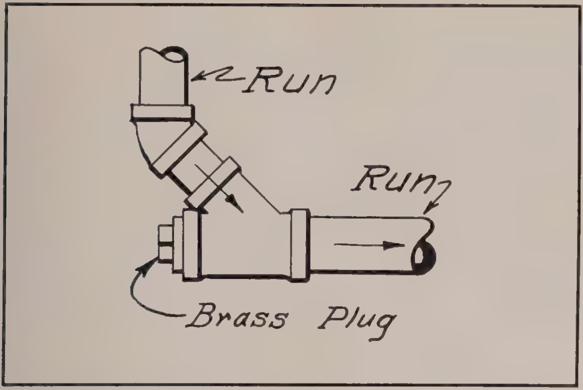


Fig. 5. Cleanout Plug Correctly Placed in Direction of Flow in Vacuum Cleaning Pipes

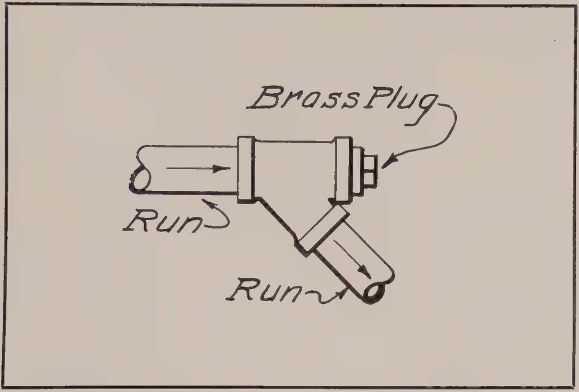


Fig. 6. Cleanout Incorrectly Placed Against Direction of Flow Causes Trouble

and trained manipulation, the hose in the building racks is made of 1½-inch size and as short as possible to facilitate handling by the occupants; but the firemen's hose is 2½ inches, in order to get a larger stream on the fire and because the firemen know how to handle the larger size at the higher pressure.

It is often desirable to place "monitors" or hose outlets on the roof to be used against fires in adjacent buildings, the fire monitor being the most expensive. The hose outlet possesses the advantage of allowing a hose to be run to any point on the parapet, whereas the location of the fire monitor is fixed. Such roof outlets should be protected against freezing by having the valves installed inside of the building with wheel handles above the roof. Valved drains should also be installed on the outlet sides of the valves to drain out the pipes after use, as otherwise the water will stand in the pipes above the roof and be exposed to freezing.

In Fig. 1 is shown a detail of a typical roof outlet, valve and drain, while in Fig. 2 is a layout of a typical standpipe system. The riser sizes vary from 4-inch to 6-inch, according to building height and local requirements; a 4-inch standpipe will supply two 2½-inch hose, a 5-inch, four 2½-inch hose, and a 6-inch about six 2½-inch hose. It is seldom that standpipe lines exceed 6 inches in size. The fire tank connection and the street connection need not exceed the size of the largest riser. In some cases fire pumps are installed for standpipe lines, but this is not usual except for very large buildings; in some districts two Siamese connections are also required.

SPRINKLERS

Closely allied with the standpipe system are automatic sprinklers. These usually require fusible heads located on about 10-foot centers on the ceilings of all rooms to be protected. Basements, factories, dry kilns, packing rooms and other locations where fires are likely to have their origin are desirable areas for sprinklers. It is not necessary to go into all the details of the various sprinkler installations, as these are governed by Underwriters' regulations which cover the subject fully. Separate Siamese connections will be required for the sprinkler system and separate reserve water, either in a sprinkler tank or in a combination tank, such as is shown in Fig. 3, where 3,000 gallons are for house use, 5,000 gallons for sprinkler use, and 5,000 gallons for standpipes. Sprinkler pumps are also required on certain installations, although the gravity tank is

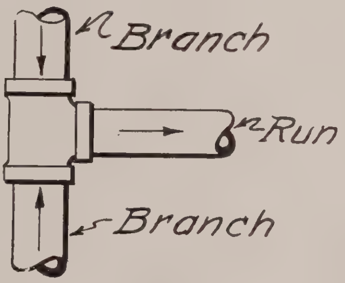


Fig. 7

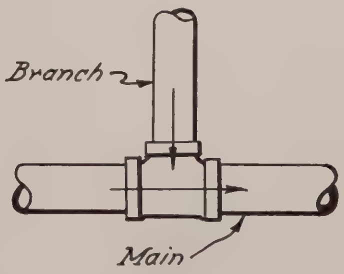


Fig. 8

Connections as shown in Figs. 7 and 8 are Easily Clogged and Should Not Be Used in the Vacuum System

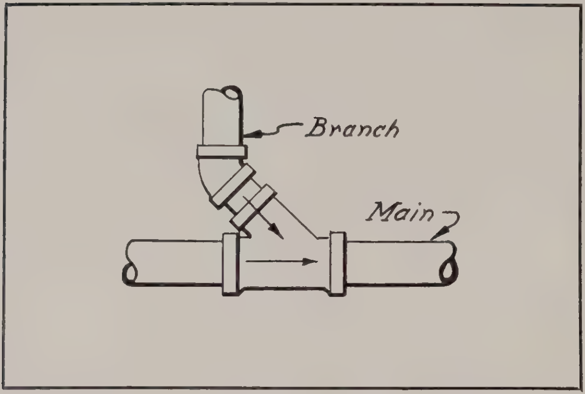


Fig. 9. Proper Connections between Horizontal Main and Branch

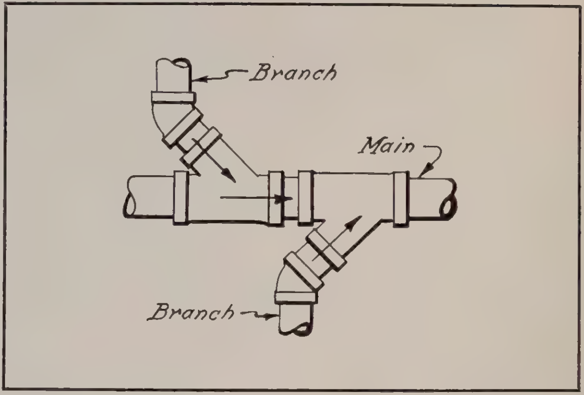


Fig. 10. Proper Connection between Main and Two Branches

regarded as the most dependable of all sources of water supply for fire protection and sprinkler use.

Piping for fire protection lines is most frequently made of galvanized steel pipe with galvanized, screwed, malleable pattern steam and water fittings. Where pressures of over 150 pounds are possible, extra heavy fittings should be used. Hose valves, hose racks and hose are often placed in hose cabinets set flush with the wall, not only to protect the hose but also for the sake of appearance. Where cabinets are used they should have manually-operated handle catches so that immediate access can be obtained by anyone at any time. A locked door and glass which requires breaking are likely to result in cutting the hose in getting it out of the cabinet. For locations where tampering is prevalent, a locked cabinet door with the key in a glassed-in box adjacent to the cabinet will be a better arrangement than a cabinet in which the glass in the cabinet itself must be broken to secure access to the hose.

VACUUM CLEANING

Vacuum cleaning may be effected by the central system in which all outlets are piped to a vacuum cleaning machine in the basement, or by means of the portable type which is run around and plugged into electric outlets at convenient locations. The portable system is perhaps not as convenient as the pipe system, but it has the merit of being less expensive to install. With the piped system it is essential to have the vacuum cleaning outlets installed in locations not only convenient for access but also so placed that a 50-foot hose when run around the halls and through doorways, etc., will actually reach to the extreme portions to be cleaned. The most desirable type of vacuum cleaning inlet is the snap-flush type which finishes flush with the wall and automatically closes when the hose is removed. Vacuum cleaning inlets are customarily located in walls near the floor, but occasionally in theaters they will be located in the floor out from the walls to avoid unreasonable lengths of hose. The size of inlet is 1¼ inches, and the pipe and riser are never made less than 1½ inches to avoid matches' clogging the line. The risers are usually carried downward, but they can be carried up a floor or two where conditions make this necessary.

The piping is nearly always of black steel, on

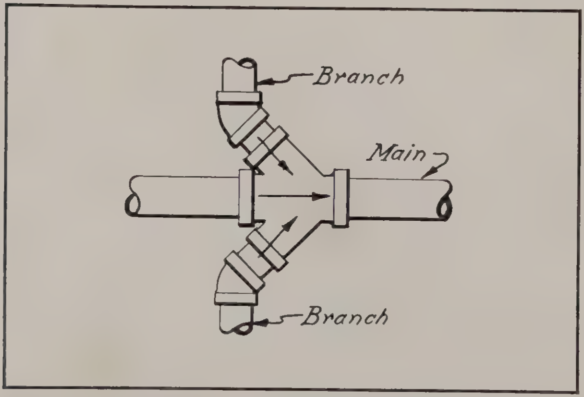


Fig. 11. Double "Y" Connections are more Subject to Stoppage than Connection Shown in Fig. 10

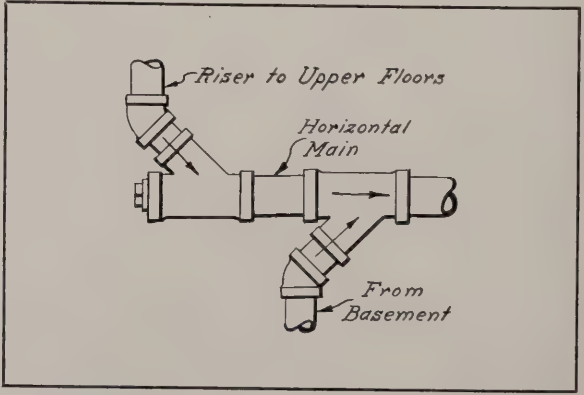


Fig. 12. Dirt from Riser Is Likely to Clog Pipe from Basement if Connections Are As Shown

account of cheapness, and of smooth interior bore, and the fittings should be black, cast-iron, long-radius, recessed drainage fittings. The sizes of the mains are determined by the maximum number of tools or sweepers for which the system is designed. The mains should not be unduly increased over the sizes actually required with the idea of securing a better pulling vacuum at the tool. This undoubtedly does result, but the oversized main also causes a large drop in velocity which tends to allow the air to slow down sufficiently to drop the dirt out of it, resulting in quickly stopping up the main. In a plant running from two to six sweepers' capacity, it is usual to consider 1½-inch risers sufficient; a 2-inch main is required for two sweepers, a 2½-inch main for four sweepers, and a 3-inch or 3½-inch main for a six-sweeper plant. In every case the main begins at 1½-inch size at the bottom of the first riser, is 2-inch after taking in the second riser, 2½-inch after taking in the third riser, and 3-inch after taking in the fourth riser, etc. As soon as the size of main is sufficient to carry all the sweepers for which the plant is designed, there is no object of any further increase in size. Fig. 4 shows typical risers for a two-story building and the method of connection to basement main.

Usually at frequent intervals brass screwed cleanout plugs are located. Where a horizontal line makes a 90 per cent turn, the cleanout should be arranged to clean in the direction of flow, as shown in Fig. 5, and not against the flow as indicated in Fig. 6. Use of such junctions as are shown in Fig. 7 and Fig. 8, employing a straight tee, is absolutely impossible, as they are easily clogged. The best way to bring one horizontal main into another is indicated in Fig. 9. If two branches are to be connected into a main at practically the same point, the branches should be connected one back of the other as shown in Fig. 10, and not into a double Y-branch as shown in Fig. 11, because dirt coming into one side of a double Y is likely to be thrown over into the opposite inlet and thus plug it. Outlets located in basement rooms and below the level of the main have to be connected to the overhead main in such a manner as to prevent the dirt from the upper floors falling into the pipe from the lower outlets; a connection such as is shown in Fig. 12 is bound to plug the basement pipe by the dirt stopping it, but if the basement pipe is brought into the horizontal main back of the upper floor connection, or if brought into the horizontal main from the side instead of from the bottom, this difficulty will be avoided. Flanges on horizontal mains at frequent points are useful on long runs to allow for cleaning.

In order to determine the number of sweepers which will be required for a given installation, 4,000 square feet of bare floor per sweeper per hour may be assumed. Upholstery and carpets of course require much more time, and the probable type of floor covering as well as the number of hours when their operation will be permissible must be considered in estimating the capacity of sweepers. In schools, for instance, it is usual to assume 2½ hours after school sessions for cleaning, and it is presumed that the average classroom can be cleaned in about 15 minutes. If the corridors and special rooms are cleaned during school sessions, this will work out to one sweeper for every eight classrooms or fractions thereof.

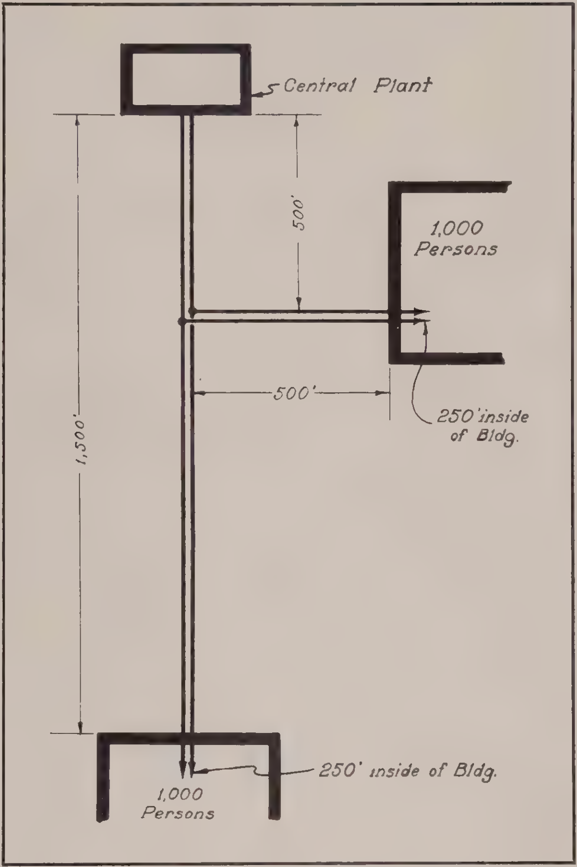
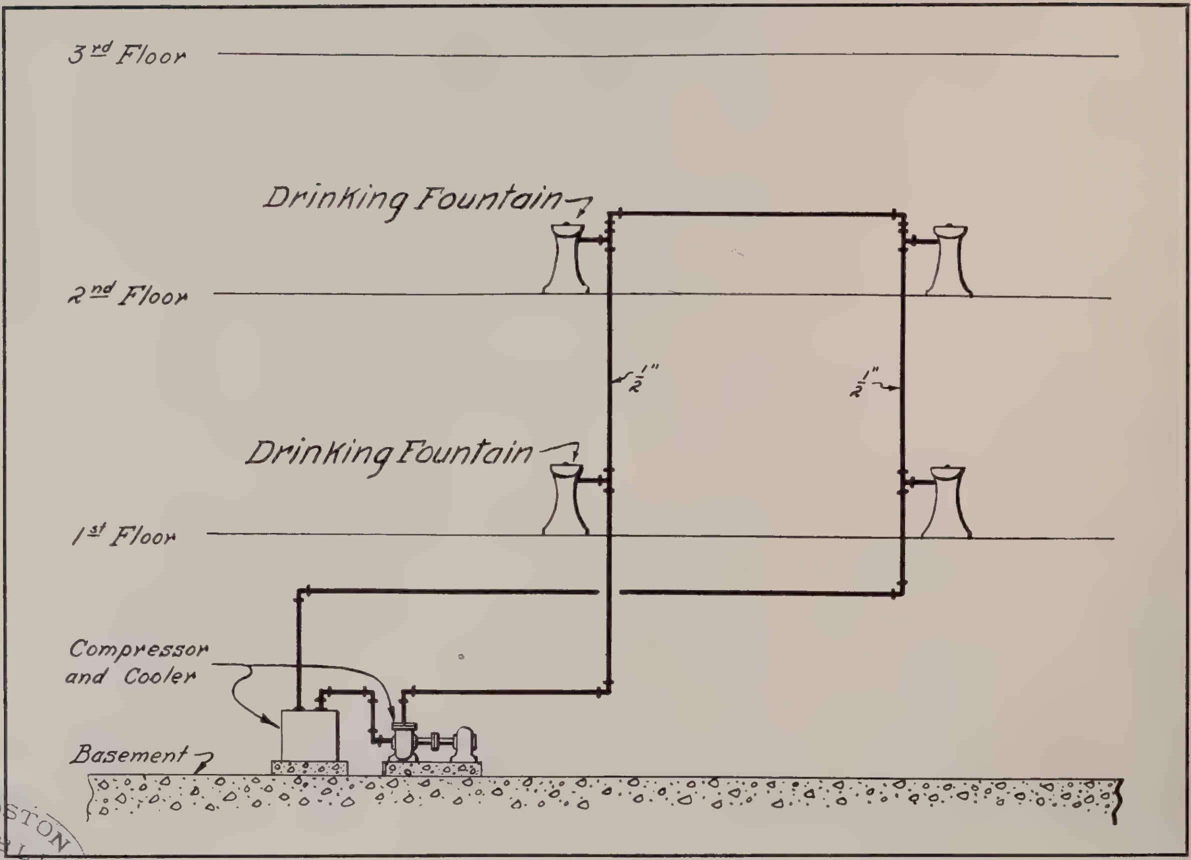


Fig. 13. In Providing Cooled Drinking Water from a Central Plant to the Other Buildings, Length of Run Is an Important Factor

DRINKING WATER SYSTEMS

Drinking water systems are of two kinds,—one in which only a few fountains are required, such as in a main hall or in the back of a theater, and the other in which outlets are required in a number of locations, as in each office of an office building or in each room of a hotel. In the small installation, a combination unit electrically operated may be obtained and a small circulation pump provided to rotate the water through the circuit (Fig. 14). In the larger systems real refrigeration, running from 3 to 10 tons' capacity, must be provided. Both large and small systems cool the



OSTON UBLIC RARY

Fig. 14. A Small Drinking Water System with Circulation Pump

water at a central point and then circulate it through drinking water supply and return mains so as to include all fountain outlets in the circuit.

The calculations for a drinking water system are more or less complicated by the matter of so much of the load's consisting of heat absorption by the pipe lines and so little being involved in the actual water furnished. In estimating for a large drinking water system the length of run is a more important item than the exact amount of water which will be required. Consequently, every effort should be made to keep the pipe lines as short as possible and as small as possible, the size being consistent with the amount of circulating head allowable on the circulating pump. Half a gallon per day is allowed per person for drinking and wastage, as this is fairly close to averages obtained in actual installations. The ideal drinking water temperature is about 50° Fahr. Refrigeration is reckoned in tons per day of 24 hours, each ton being equal to about 200 B.t.u. per minute. In order to determine the quantity of water which it is necessary to circulate, it is necessary to know the allowable rise in water temperature permissible while traveling around the circuit and the amount of heat absorption by the circuit. The heat absorption is determined by the pipe size, and the pipe size is determined by the circulation which it is desired to calculate. From this it will be seen that the whole matter travels in a circle, and that in order to break the circle, certain arbitrary factors must initially be assumed, only to be corrected later if the results indicate that they are incorrect.

These factors may be settled upon at once as a basis for calculation:

(*a*) The average water temperature in the system is to be 50° Fahr.

(*b*) The maximum temperature in the building will not exceed 100° Fahr.

(*c*) The efficiency of the drinking water covering will approximate 80 per cent.

(*d*) The circulation head allowable on the drinking water pump should not exceed 25 feet (or 10.8 pounds per square inch).

The next assumptions are only tentative and will require modification when more figures have been worked out.

(1) That the average size of line for the system is 1½ inch.

(2) That the variation in water temperature shall not exceed 10° Fahr. across the ends of the mains in the central plant.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

THE DUTIES OF SUPERINTENDENTS—(*Continued*)

Editor's Note. This second part of Mr. Beach's series continues Chapter 2 which appeared in the January issue of The Architectural Forum.

17. *Job Program.* At the beginning of a given work, the Chief Construction Engineer will confer with the contractors and agree with them upon a job program and time schedule, from which will be determined the time for ordering all materials, dates when they should be in readiness, and the degree of advancement of the whole work at each fortnightly interval. It shall thereafter be the duty of the Superintendent to bend every effort toward seeing that each contractor and foreman is doing his best to live up to this program and is looking ahead and planning accordingly. If not, he should be required to show cause. The Home Office demands specific information on such matters.

18. *Changes.* No employe of this office will be excused for suggesting a change to an Owner or Contractor. Any advice or criticism is to be made to the Chief or to the Home Office direct. It will be welcomed as part of the whole-hearted service each employe is expected to render; but the Home Office will take care of all such business dealings with both Owner and Contractor. The Superintendent must notify the Home Office immediately in event of any expression of dissatisfaction on the part of the Owner and shall not allow the portion of the work involved to proceed until a permanent or temporary settlement of the point has been made.

The Home Office will prepare an "Extra Work Order" and send a copy to the Contractor and one to the job office, covering each piece of extra work added to the original contract. Such orders will bear consecutive numbering and will show in detail the specific sort of work to be done and the basis of payment for it (percentage rate, if cost-plus; or stipulated amount, if lump-sum). Similar order will be issued covering each deduction. For all cost-plus work, whether for specific extras, for cleaning premises, plaster patching, glass replacement, or for any other work for which a Contractor expects to collect in addition to his contract price, the Superintendent must keep a daily record and check it each day with that of the Contractor, as the only method by which an authentic accounting can afterwards be made.

19. *Tests.* The Superintendent must post himself regarding all tests called for; know when they are to be made and be sure to witness them. Later, he must secure and forward to the Home Office all records, exactly as specified. He should look ahead and be in a position to recommend tests where they appear necessary, in addition to those specifically called for. In this connection, he should have an early understanding with his Chief regarding tests of the bearing capacity of the soil, if any are indicated, and arrange for them accordingly.

20. *Coöperation.* One of the most important duties of a man assigned to watch construction is to actively assist in coördinating the various branches of field work so that all crafts will work together harmoniously. Matters of working space, storage space for materials and questions of job procedure are all up to the Superintendent to take care of before the occurrence of misunderstandings or conflicts.

21. *Expediting.* It is a distinct duty of a man supervising construction to follow up all work promptly upon his assignment to a job, and continuously thereafter. This means knowing at all times the state of progress of shop drawings, fabrication and manufacture of all various materials, such as cut stone, terra cotta, structural steel and iron, millwork, etc. It is dead wrong to assume that these matters take care of themselves in due time, but it is the particular duty of a Superintendent to keep himself informed as to the exact status of every subject pertaining to his job.

22. *In General.* The Appointee will be held responsible to the Home Office for all details in the conduct of the work to completion, or will have to be convincing in otherwise fixing such responsibility. The loyalty of the Home Office to the Owner is its first consideration, but the success of our operations depends greatly upon the loyalty of our employes to the Home Office and to the job. Therefore,

Don't gossip about the work.

Don't be undignified in either your language or your deportment.

Don't get chummy with men on the job or with their employers.

Don't accept favors from contractors, subcontractors, material dealers or employes, large or small.

Don't be unfair. You'll lose your point.

Don't lose your temper. Simulate righteous wrath, if advisable, but do so deliberately and remain in command of yourself and the situation.

Keep your head up and your mind clear.

These instructions may be deemed by some to be much more explicit than necessary. Others may consider them lacking. The main fact is, simply, that every Superintendent needs a guide. It is foolish for a Construction Manager to throw a set of prints and specifications at a new man, saying, "There it is. Show us the kind of stuff that's in you." It may serve to enable the manager to size up his man, but the test is made at the expense of the job and its Owner. It is much better to provide the stranger with a set of instructions and a scratch pad and give him at least a day in the office. He can then be adjudged in a preliminary way, at the expense of his new employer, by his notes, comments and questions; and the manager or Architect has saved himself a lot of oral explanations of his office practice. Written instructions cause fewer misunderstandings.

CHAPTER 3

SUPERINTENDENT'S RECORDS

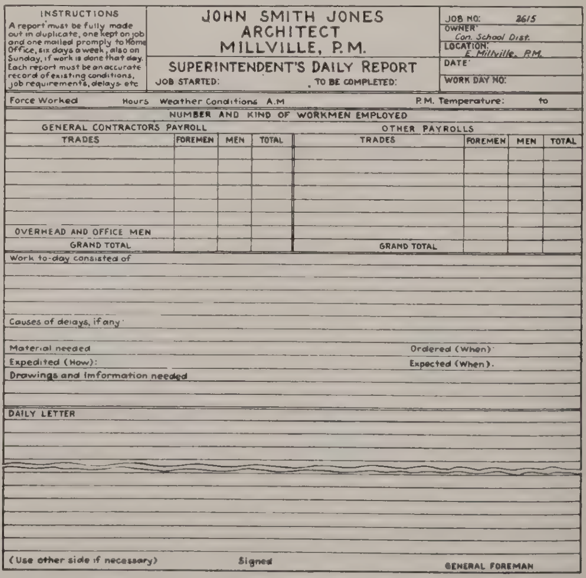
WHETHER or not there be foundation of fact for the oft-repeated statement that "architects are not good business men," it certainly behooves all members of the profession to "take stock" of themselves and their practice at intervals, to make sure that their offices deserve no such accusation.

Following the line of least resistance is one of the most characteristic of human foibles,—and he of manifest artistic temperament is by no means to consider himself immune from such a tendency; rather should he take particular pains to fortify himself against it. Some do this wisely by associating themselves with others whose natural aptitudes and tendencies are more on the practical and business side, the two thus complementing each other to compose a smoothly working concern. Others employ the necessary commercial talent; and still others of smaller practice, but intent upon providing service of the highest class, school themselves to the use of system, albeit extremely irksome at times.

When an owner employs an architect to supervise the construction of a building which that architect has planned, such owner is quite obviously entitled to a recorded history of the construction operations. Requiring the contractor to produce progress photographs at stated intervals scarcely fills the bill; neither do a few desultory notations in the superintendent's pocket note-book, nor even occasional entries by that individual in the office job file. There is nothing to be substituted for a complete record made at regular intervals during the progress of the work. On structures of any importance the record should be made daily,—at least during the major part of the performance. If the architect assumes himself to be a necessary concomitant of every building operation, he should make sure that the service he renders is as nearly beyond criticism as it is humanly possible to make it. This is due to himself as well as to clients.

After a fashion, he stands on a pedestal,—fair mark for every shaft. Let his armor, then, be as nearly complete and invulnerable as he can find means to make it. Some too-clever sharpshooter will find the victim's unprotected heel in any event. It is peculiarly characteristic of human kind that anything derogatory to a person's reputation will be broadcasted far more rapidly than will something especially creditable. An architect intent upon making a name for himself as a high class designer may be surprised to discover that he is better known as a slipshod performer. Due warning of this should be impressed upon every construction superintendent.

It is well also for the superintendent to bear in mind that there are several reasons for his employment. Watching the work is but one of these. If the contractors are honest and none is losing money on his contract, the work of inspection may be the least arduous of a superintendent's duties. It is to be regretted that the natural inference to be drawn from the fact that a superintendent has been detailed to oversee a particular operation is



INSTRUCTIONS
A report must be fully made out in duplicate, one kept on job and one mailed promply to Home Office, six days a week, also on Sunday, if work is done that day. Each report must be an accurate record of existing conditions, job requirements, delays etc

JOHN SMITH JONES
ARCHITECT
MILLVILLE, P.M.

SUPERINTENDENT'S DAILY REPORT

JOB STARTED: . TO BE COMPLETED:

JOB NO: 2615
OWNER: Con. School Dist.
LOCATION: E. Millville, P.M.
DATE:
WORK DAY NO:

Force Worked Hours Weather Conditions A.M P.M. Temperature: to

NUMBER AND KIND OF WORKMEN EMPLOYED

GENERAL CONTRACTORS PAYROLL / OTHER PAYROLLS

TRADES	FOREMEN	MEN	TOTAL	TRADES	FOREMEN	MEN	TOTAL
OVERHEAD AND OFFICE MEN							
GRAND TOTAL				GRAND TOTAL			

Work to-day consisted of

Causes of delays, if any

Material needed Ordered (When)

Expedited (How): Expected (When).

Drawings and Information needed

DAILY LETTER

(Use other side if necessary) Signed GENERAL FOREMAN

Fig. 1. Superintendent's Daily Report. The Original is 8½ x 11 inches

that contractors are likely to cheat, when, if and as opportunity offers. This assumption should be amended by saying that contractors are merely average humans, some honest and some otherwise. It is the business of a superintendent of building construction to ascertain which type of man the owner is dealing with, and to function accordingly.

There is no doubt but that the system of competitive bidding contracting generally in vogue in architects' offices throughout the land offers peculiar temptations to individuals who rely upon their cleverness in evading, substituting and covering up. Such swindlers deliberately allot portions of their work to others at figures which induce similar crookedness on the part of their subcontractors. In order to avoid such abuse of the owner's trust, the wise architect will use his best efforts to prevent the awarding of contracts to concerns other than those of known integrity. This custom results ultimately in the compilation of lists of general and trade contractors acceptable in such an office, made up of those who are known to refrain from dishonest practices.

Supervision of the work of these concerns resolves itself mainly into a matter of assisting in interpreting contract documents and generally expediting the work. To be sure, a penurious owner will seek to defeat this by insisting upon the retention of the low bidder, regardless of the latter's reputation, claiming the privilege of reliance upon the contractor's bond and the architect's supervision to secure his money's worth. The mistaken economy of such procedure is easily demonstrable. It is much safer for an owner to entrust his work to a reputable contractor without a bond than to commit it to an individual with a shady reputation who is apparently protected by a bond. But, even under those contractors intent upon honorably carrying out their obligations, one must be always alert in detecting mistakes or willful wrong doing of workmen and subcontractors.

An example of this is seen in the performance of those concrete foremen and laborers who persist in "saving" cement whenever the inspector's back is turned, even when their employer has given no such instructions. One such workman, in his misguided zeal for his employer's interest, was seen to be using heaping shovels in measuring sand and gravel, but not more than one-fourth as much in each shovel in doling out the cement. Similar defections must be guarded against in other trades. The author will call attention to these as the reader is conducted successively in these articles through the various trade operations as the work progresses; but there can be no such thing as a complete category of contractors' and laborers' shortcomings. These are likely to crop out when least expected and the necessity for their prompt detection keeps a superintendent constantly alive and vigilant in the exercise of his duties.

The supervisory duties of an architect (he being best termed the "supervisor" and his representative the "superintendent") are well expressed in his contract with the owner, thus:

"The Architect's supervision shall include assistance to the Owner in:

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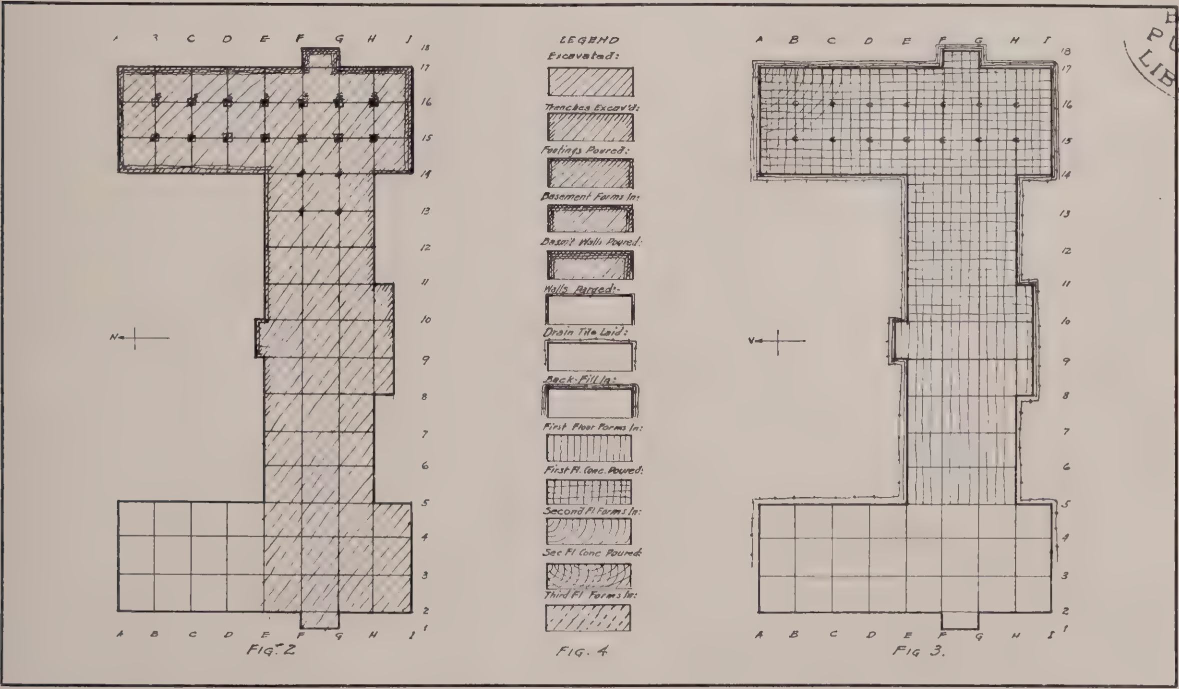
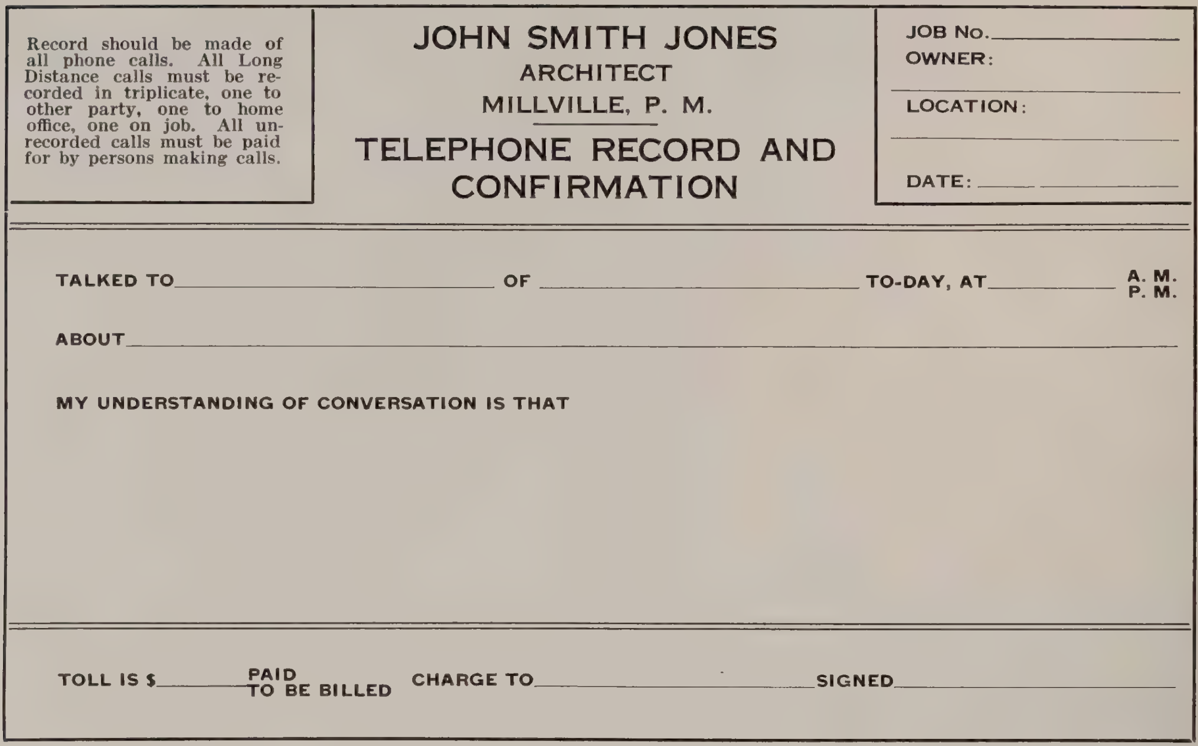


FIG. 2 FIG. 4 FIG. 3.

Figs. 2, 3 and 4. Methods of Recording Construction Progress as Explained on Page 300



Record should be made of all phone calls. All Long Distance calls must be recorded in triplicate, one to other party, one to home office, one on job. All unrecorded calls must be paid for by persons making calls.

JOHN SMITH JONES
ARCHITECT
MILLVILLE, P. M.

TELEPHONE RECORD AND CONFIRMATION

JOB No.__________
OWNER:
LOCATION:
DATE:__________

TALKED TO__________ OF __________ TO-DAY, AT__________ A. M. P. M.

ABOUT__________

MY UNDERSTANDING OF CONVERSATION IS THAT

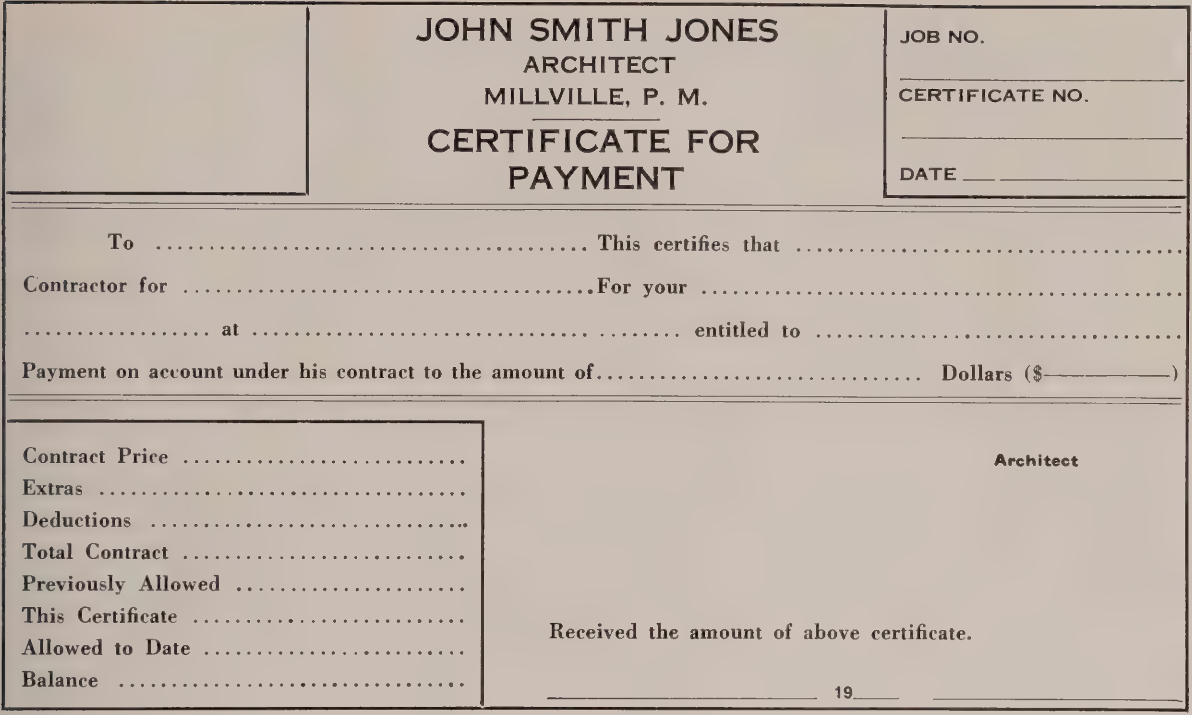
TOLL IS $__________ PAID TO BE BILLED CHARGE TO__________ SIGNED__________

Fig. 5. Telephone Record and Confirmation Blank. Original 8½ x 5½ inches

1. Maintaining an effective working organization of the contractors employed on the structure.
2. Instructing them as to their work.
3. Passing upon the merits of materials and workmanship.
4. Demanding correction and remedy of all discovered defects.
5. Keeping accurate records of all conditions pertaining to the work.
6. Computing partial payments due contractors and issuing certificates for them.
7. Auditing payments to subcontractors and material supply concerns to prevent the filing of mechanics' liens."

For the duties involved in item 5, the superintendent is supplied with certain forms and is instructed as to their use. Principal of these is the "Daily Report" report blank, a specimen of which is shown in Fig. 1. If these blanks are especially printed for a given job, it is well to have an outline diagram of the building plan printed on the back, occupying about half the page, leaving the remainder for notes and correspondence. If a diagram is not so printed, a rubber stamp can be cheaply made and used for the purpose. This should include a number of small rectangles in which the symbols used can be indicated. The importance of filling in every item every day (or at other stipulated intervals) cannot be too thoroughly impressed upon the superintendent. He must keep the home office posted fully and faithfully. It may take a half hour or longer to fill out a report after a busy day, but his time cannot be more valuably employed. His records may be the means of settling more than one controversy and of saving the owner much time and expense,—and of relieving the architect of much worry. Figs. 2, 3 and 4 illustrate methods of recording construction progress. This is merely a matter of compiling a "legend" or series of symbols and proceeding accordingly. The use of colored pencils for the purpose will afford much greater flexibility and legibility than is indicated in these examples. When a superintendent is required to stipulate at regular intervals just what percentage of each contract or trade is completed (or its degree of progress), these daily diagrams will materially aid in computing such percentages.

It can readily be seen, from inspection of the diagram in Fig. 2, that, at the time it was filled in, the general excavating was complete, except the north end of west wing; more than half of the outside wall trenches had been dug, also about one third of those for the column footings; outside wall footings of each wing and half of those under north wall had been poured, also the footings under 14 columns of the east wing; forms had been erected for outside basement walls of the east wing and concrete poured therein; and basement steel had been erected along column line 16. Diagram of Fig. 3 shows first floor forms all in



JOHN SMITH JONES
ARCHITECT
MILLVILLE, P. M.

CERTIFICATE FOR PAYMENT

JOB NO. ____________
CERTIFICATE NO. ____________
DATE ____________

To .... This certifies that ....
Contractor for .... For your ....
.... at .... entitled to ....
Payment on account under his contract to the amount of.............................. Dollars ($————)

Contract Price ....
Extras ....
Deductions ....
Total Contract ....
Previously Allowed ....
This Certificate ....
Allowed to Date ....
Balance ....

Architect

Received the amount of above certificate.

____________ 19____ ____________

Fig. 6. Certificate for Payment. Original 8½ x 5½ inches

place, except in west wing, and concrete in them extending almost to center line of building; columns erected along lines 15 and 16, and second floor form work started in northeast corner; basement walls stripped and parged, except west wing and adjoining portion of front wall; drain tile laid along outside of footings, except for a portion of west wing; and back filling well under way around east wing. It is easy, of course, to try to record too much, thus rendering the diagrams too intricate to be readily filled in and too involved to be quickly comprehended. Again, one should be sure than common sense is standing by him. "One's system should be ever the servant, never the master." If an architect be superintending his own work, he will find it to his advantage to keep job records as faithfully as if he were reporting to someone else. It is the surest way to avoid falling into slipshod habits.

Another preventive against carelessness is the habit of recording telephone conversations immediately after the receiver is returned to the hook. This habit can be more readily formed if special blanks for the purpose, with carbon sheets in place, are kept handy. Fig. 5 is a specimen of such a blank. Fig. 6 is the certificate for monthly payments. This is of ordinary form, except that more space than usual is allowed for the record of accounts with the contractor. These certificates may be made out by either the architect or his superintendent, but are customarily signed by the architect personally. Contractors have been known to make a practice of depositing them to their bank accounts, the same as checks, and the importance of care and exactness in their preparation cannot be over-rated.

The bookkeeping upon which the issuance of certificates is based need not be complicated if a proper record book (preferably loose-leaf) is used. The pages should be ruled for eight columns of figures, preceded by four columns for explanatory matter to accommodate these entries:

Column

1. Date of contract.
2. Name of contractor.
3. Kind of contract.
4. Number of certificate or change order.
5. Amount of contract.
6. Amount of extra.
7. Amount of deduction.
8. Total net changes, plus or minus.
9. Total net contract.
10. Amount of partial payment.
11. Total payments to date.
12. Amount of unpaid balance.

Thus each entry is a complete record to date of the particular contract recorded, and there should be no question of anything failing to balance later on. On small jobs, a single page can be used, each line consecutively, for all contracts, and all entries made chronologically. On larger work, each major contract should be allotted a separate page. On work remote from the home office, a duplicate of these accounts should be part of the superintendent's file at the job and should be frequently checked with the home office record.

The method of computing the amounts of monthly payments is more strictly a matter of office procedure than it is a duty of the superintendent, though he is often called upon to perform the service. For this, reference is had to a copy of the detailed estimate of job costs which should be part of the file records, whether compiled by the contractor or in the architect's office. In the former case, the figures should be carefully reviewed and checked by the architect. An instance can be cited where a contractor added a considerable amount to such items as excavating and foundations, and correspondingly reduced such items as painting and glazing, which are among the things last completed. As a result, when he confessed insolvency at the time the work was half finished, it was found that, instead of receiving 85 per cent of the value of material and labor as the work progressed, he had actually collected about 110 per cent. In view of such a possibility, it is well, when a contract is about two-thirds or three-fourths fulfilled, to estimate the value of work still to be done, rather than what has been done, and to compile the remaining certificates accordingly. One is wise, too, to have the article on partial payments in the contract read that they shall be based, not "on the actual value of labor and material incorporated in the work" (or "delivered on the premises," as the case may be) but on "the architect's estimate" of such value. This renders the protests of a grasping contractor of no avail against an architect's firm convictions.

If payments are to include amounts sufficient to cover unused materials on the premises, the superintendent is then charged with observing that there is no undue surplus of any material delivered and that none for which allowance has been made is hauled away. On work of moderate size, all such difficulties can be avoided by arranging to have payments fall due in five (or other suitable number) equal installments, at such times as "when first floor framing is in place," "when roof is on," etc.; the final payment being due 30 or 35 days after the work is accepted.

Whoever is charged with this task of issuing certificates should have sufficient knowledge of the working of the mechanics' lien laws in the state in which the work is located to prevent any liens being filed. Where contractors are accustomed to file waivers of liens from subcontractors and material men or to submit sworn statements that all material and labor are paid for, they do so without demur. In any case, the architect must see that the owner's interest in this respect is fully safeguarded. It is one of his important obligations.

CHAPTER 4

THE FIRST DAY ON THE JOB

WHETHER one be a green novice setting forth to act as clerk-of-the-works or inspector on his first assignment or if he be a seasoned superintendent, to whom the passing from job to job is an old story, there is always something akin to the spirit of adventure in the approach to the beginning of a work of construction. Regardless of what may have happened on other operations, some features of this are bound to be different. New situations are forever arising, new emergencies to be met, fresh experience to be gained.

The appointment of a superintendent is made about the time contracts are awarded, and he at once confers with the architect (or construction manager) on all the various details pertaining to the conduct of the work. A time schedule has been arranged with the principal contractors, general, heating, plumbing and electrical. The general contractor has submitted a list of his "subs," which is given to the superintendent with instructions to look up those residing in the city where the building is to be erected. He is also given a complete set of contract documents and a copy of "Instructions to Superintendents" and is told to spend a day or two in the office acquainting himself with it and with the file records before presenting himself at the building site. He makes note of such items as are left to the judgment of the architect for decision and either discusses them with him or marks the items for future reference. A superintendent knows that a specification frequently stipulates that the decision of the architect will govern this or that, when it is actually expected that the ruling will be made by the man on the job, whether he be the architect himself or his representative. In this respect, as in all others, the superintendent should have a very definite understanding as to just how much authority and responsibility are to be vested in him.

He should also be most particular to "iron out" all changes and addenda which have been incorporated in the contract by virtue of the acceptance of alternates or the issue of change orders. The ramifications of some of these may extend throughout the entire construction, and it makes much smoother going for the superintendent to be set right at the start, and at the home office on everything that appears the least bit hazy, rather than to bother with such uncertainties at the job, where there are plenty of other duties to absorb his attention. For the same reason, he will be as meticulous as time will permit in reviewing drawings and specifications before departing for the scene of action, knowing that the requisite checking and cross-checking are too likely to be neglected, if postponed.

In going through the specifications, he notes particularly those clauses which apply particularly to the initiation of the work, inasmuch as he should be familiar with these at the time of his arrival. Some of the clauses in the General Conditions published by the American Institute of Architects he finds to be only partially applicable to his particular work. For instance, in "Art. 12. Protection of Work and Property," he reads, "He (the Contractor) shall adequately protect adjacent property as provided by law and the Contract Documents." This school site (being considered here) is so isolated as to render it unlikely that the building operations will in any way threaten damage to property adjoining. If, however, the contractor's work should happen to be in a busy section of the city, this protection clause is most pertinent. State laws vary somewhat as to whose is the responsibility for party line construction operations carried on immediately adjacent to existing structures. If, as in Illinois, the law provides that the adjoining property owner must, on due notice, take necessary steps to protect himself against possible damage, then it is up to the architect to see that proper legal notice is duly served before construction begins. It thereafter is the business of architect, superintendent and all others concerned to closely coöperate to the end that all indicated precautions are observed to properly safeguard the interests of all parties. If shoring is needed, it is within the province of the contractor to see to it that such protection is adequate and to coöperate with the party employed to look after the interests of the adjoining owner. This specification clause governs:

> "The Contractor shall provide all permanent and temporary shoring, anchoring and bracing reasonably required by the nature of his work, in order to make all parts absolutely stable and rigid, even where such shoring, anchoring and bracing are not explicitly called for. He will be held strictly accountable for any damage resulting from failure to provide it, either through lack of proper judgment or from any other cause."

In this, as in other cases where the contractor is supposed to use his own best judgment and has, by contract, accepted responsibility for so doing, the superintendent must be exceedingly careful not to unduly stress his own ideas, whether he be in agreement with those of the contractor or at odds with them. It is general practice to hold the contractor liable in all matters pertaining to the adequacy and working capacity of the temporary facilities, as well as that of his equipment. Therefore, although it is the plain duty of the superintendent to warn the contractor of anything deemed insufficient, defective or otherwise improper, the character of the warning should be such as not to, in any degree whatever, imply that either the superintendent or his employers have any hand in the corrections or improvements adopted. This does not mean that either the superintendent or the architect is improperly evading in any way. The line of demarcation between their responsibilities and those of the contractors is, or should be, plainly drawn, and there is no need of either's encroaching on the other.

An example of the trouble that may result from a superintendent's carelessness in this regard occurred on a certain building where a contractor's men had secured a derrick guy-wire to a growing tree. Fearing that the tree might suffer damage, because of its small size, the superintendent suggested a better anchorage for the guy. The foreman thereupon had the wire removed and attached to the floor construction of a well filled cement shed. The superintendent, in an unguarded moment, gave assent to the change, but neither he nor the foreman noticed when the quantity of cement in the shed was too greatly reduced and an unusually heavy load on the derrick wrecked the shed and caused considerable damage to the work under construction. The contractor claimed cause of action against the owner on the ground that the latter's agent had compelled the foreman to change a safe anchorage to an anchorage which was dangerous.

Arrived at the site of the new school building on a certain Monday morning in April, two days ahead of the scheduled time for beginning the work, our superintendent found the excavating contractor already on hand, with several men and teams operating slip scrapers, and a steam shovel working its way into position. The superintendent had been charged by the architect to receive the general contractor's bond and send it in for approval, also to secure the name of his liability insurance company and the number of his policy. He found the contractor directing some carpenters as to locating temporary buildings and was promptly given both the bond and the information as to liability insurance policy. It may be assumed that the matter of acceptance of a contractor's bond is strictly an office transaction with which the superintendent has nothing to do. But, inasmuch as the contractor is technically trespassing on the property until acceptance of his bond has validated his contract, it is incumbent upon the superintendent to bear this in mind and act accordingly. The details of this incident are therefore given as being typical of cases of the kind.

The bond was found to be the regular printed form of a surety company, properly licensed to do business in the state, instead of being on the form supplied by the architect, of which the superintendent had a copy, and duplicates of which had been sent the contractor. The contractor, in defense of his occupancy of the premises before formal approval of the bond, said that he was told by the agent (who happened to be a member of the board of education) that he knew the bond would be acceptable and that it would be all right for him to take every possible advantage of the good weather; but the contractor could not explain why the architect's form of bond (which was that of the Illinois Society of Architects) had been ignored. Inasmuch as it was evident that both the board member and the contractor had exceeded their authority, it was evident that a situation had developed right at the start that demanded careful handling. If the superintendent stopped the work and ordered the men and equipment off the premises, he would only be making trouble and creating antagonism that would not easily wear off. Later, if charged with improper delays, the contractor might allege in defense that there was a lack of coöperation from the very beginning of the work. The superintendent chose the better plan by suggesting that they call together on the agent, it being understood between themselves that, pending approval of a bond, the contractor was trespassing and subject to ouster.

Before leaving the site, the superintendent directed the contractor to box certain trees and mark for removal certain others that were too close to the building site. He also called attention to the damage already done to walks and curbs by driving over them, and he suggested the locations of four driveways with protection of walks and curbs as specified, citing the specification paragraphs on these subjects:

"BOXING TREES. All trees and shrubbery endangered by operations under this contract shall be carefully and adequately boxed with substantial planking."

"ALL WALKS, CURBS AND FENCES that are to remain shall be adequately protected wherever liable to damage. If driveways across sidewalks (other than those indicated) are used, such walks and adjoining curbs shall be protected by 2" planking and 6" of tamped earth. No driving over unprotected walks will be permitted."

The contractor agreed to give these subjects proper attention and added that he would have a foreman and additional carpenters on the job in the afternoon and get the building staked out.

The agent was in and appeared surprised that there should be any question as to the form of bond. He admitted having transmitted the architect's printed form to his company but supposed that his concern never issued a bond on other than its own form, of which he had handled many. He was so evidently inclined to make an issue of the subject that the superintendent suggested the advisability of calling a meeting of the building committee for discussion of the subject. This resulted in an evening session of the entire board at which the superintendent explained the difference between the two forms of bond and pointed out that the architect's form compelled the surety simply to carry out the terms of the contract, should the contractor fail to do so, whereas the form submitted contained several clauses making it incumbent upon the owner to do certain things to protect the surety company, which the owner might easily fail to do,—had no previous intention of doing. The agent continued to insist, contrary to the opinion of the superintendent, that his company would not change its form, which insistence induced the contractor to suggest the feasibility of his putting up a personal bond, signed by two local property holders of sufficient means. He also called attention to the fact that he had stated in his bid that he would deduct the price of a bond ($10,500) if the surety should be waived, adding that his company was so well and favorably known that it was seldom asked for a bond, the cost of it being a sheer waste of good money. Asked for his views on the subject, the superintendent heartily endorsed the latter opinion and stated the attitude of the architect on the whole subject.

The objections to a personal bond are, first, that someone must accept the responsibility for approval as bondsmen,—men who are not officially registered as such, as are accredited surety companies; next, that, in case of default and suit against such bondsmen, they can readily enlist the sympathy of jurymen, in the character of innocent martyrs being sacrificed for their friend to the benefit of the community, the verdict resulting in some sort of a compromise, though the same jury would be quite ready to hold an outside corporation for the full amount of the loss, a good part of which would be considered as covered by the original premium. Further, the endorsers of a personal bond are necessarily persons of good standing in their community, men whose good will one does not care to jeopardize by forcing them to incur heavy financial loss in case the worst should happen.

(*To be continued in the April, 1929 issue of* THE ARCHITECTURAL FORUM)

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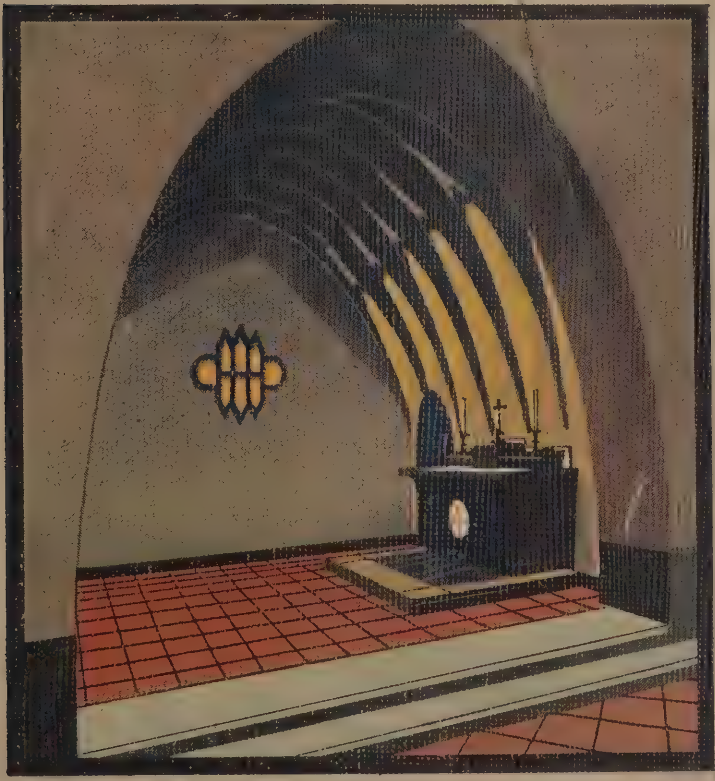
THE ARCHITECTURAL FORUM

IN TWO PARTS



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MARCH
1929

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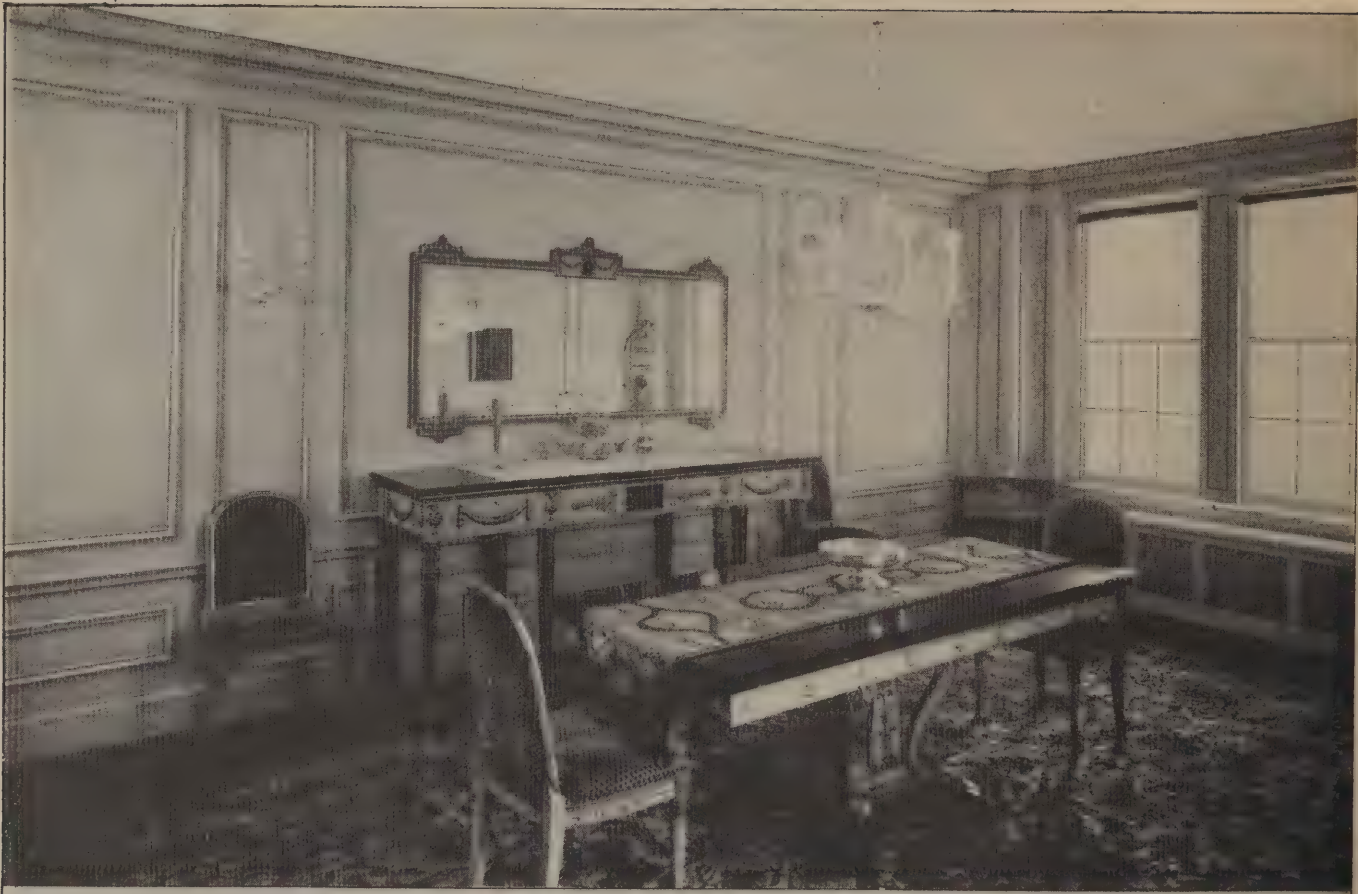

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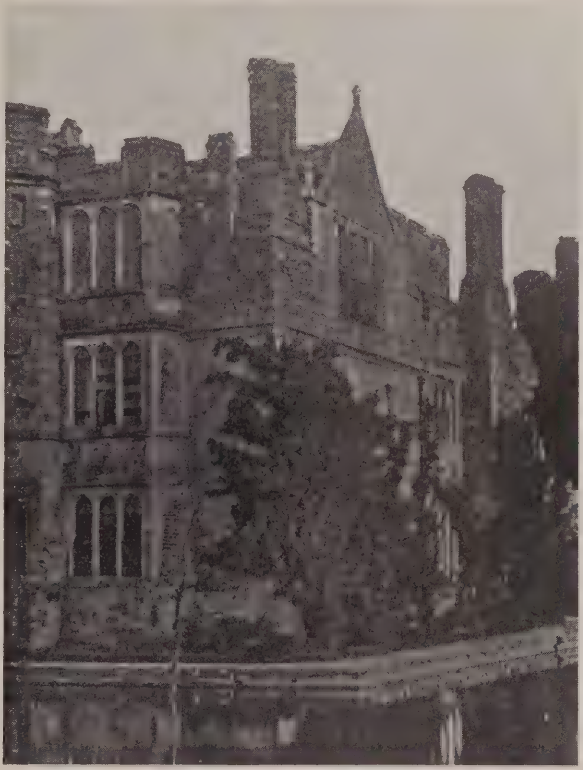
BOOK DEPARTMENT

A NEW EDITION OF GARNER AND STRATTON

REVIEWED BY WILLIAM P. SPRATLING

WHETHER one is sympathetic with the Tudor period or not,—and whether as an architect one would care to express oneself in that medium,—almost anyone, we feel, will experience a glow of admiration for the thoroughness and sympathetic treatment of the subject in this now classic two-volume edition of Garner and Stratton. Here is a period in the development of architecture intensely interesting not only to architects but to everyone interested in pure craftsmanship; and whatever else that period may or may not have been, it was certainly an era made rich by the fertile imaginations of real craftsmen who worked with a sound understanding of their materials and who, it appears, enjoyed not only the encouragement but the whole-hearted support of the particular clients for whom they built.



Hever Castle, Kent

This new edition of Garner and Stratton's, it should be noted, contains a number of improvements over the earlier edition of 1910. The two volumes are more compact, with a page size just sufficiently small to permit their being more easily handled, and besides the addition of nearly 20 more distinguished examples of domestic architecture, the entire indexing of the volume has been vastly improved. In the very complete index provided it is now possible to locate an example topographically, illustratively, or according to its particular subject as a detail. The work in its present form probably presents the perfect example of a thorough architectural study of a period. This is no mere collection of illustrations from photographs casually gathered and presented in a trick binding, and with perhaps a two-page indefinitive appraisal of its subject. There are included here more than 200 full-page plates, and in addition to these illustrations there are probably several hundred others which are embodied in the text; and the text itself is much more than a cursory review of the subject. As a matter of fact, if the material which is spread over some 152 pages of the first volume and 237 pages of the second were reset to a more common page size, the material presented would perhaps equal in bulk the 1200-page treatise of Fletcher's on the history of architecture. And the pages are not only generously but pertinently illustrated. Besides illustrations from photographs, there are innumerable beautifully drawn detail plates throughout the text of both volumes,—details often practical.

Referring to these plates in the introduction, the authors say ". . . This collection of detail plates will doubtless appeal to some as the most valuable part of the whole work; their preparation has certainly proved to be the most difficult part of the undertaking, and on them much of the time occupied in the production of the work has been spent. Although most useful in their analysis of the various features which go to make up a Tudor house, and an unfailing source of inspiration to the designer, they need to be handled with discrimination. A gable, a window, a doorway or a sculptured panel which in its original position may be thoroughly satisfactory alike to the eye and to the mind, when indiscriminately applied to another building would very probably fail to arouse the same feelings, because of the change in position and surroundings." This reference to localism is very important in America, where there are naturally many localities where the styles presented in these volumes would not only be not appropriate, but uncomfortable on account of climatic differences. However, it would be ridiculous to presuppose that the domestic Tudor architecture of England is a dead thing. It must be understood that the Tudor was perhaps the most intensely nationalistic expression that England ever developed, peculiarly interesting in its domestic expressions. It will be many years before certain ingenuities in the use of finely set stone and the marvels of its carved woodwork are surpassed. England, of all modern countries, is in a curious way perhaps the country most laden with traditions. And of her traditions, domestic architecture of the Tudor period has perhaps been the most faithfully held to and the most enduring. Furthermore, these good, healthy English traditions will persist wherever the English-speaking race predominates.

Occasionally Mr. Stratton departs from a pure study of his subject long enough to plead for a preservation

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THE search for effective types of architecture for domestic use led logically to the re-discovery of the style known as the "Greek Revival." In the hands of a few particularly skillful architects it is being used with marked success, their use being based largely upon study of such examples as have survived the period, just prior to the Civil War, when use of the type was widespread throughout the United States. It is an entirely American style, founded not upon a following of current English architecture but upon a study by Americans of classic types adapted to domestic uses.

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of the old things. He notes in his introduction that "love of home is a strong characteristic of the English race, yet as a nation England has done little to preserve what has been bequeathed from the past. The essentially national type of fifteenth and sixteenth century domestic architecture, which is her precious heritage, has hitherto received no adequate recognition, and in only too many instances no effort has been made to stop the work of destruction which has already robbed the country of many of its finest works of craftsmanship in materials of widely different natures." In the pages of his text, and in connection with the fine old houses which are presented, one comes across a constant pageant of great names:—there are Henry VIII, Cardinal Wolsey, Holbein and so on. And the author notes that the period really began before the time of Henry VIII; that actually as a phase of development it carried on much that was Gothic in tradition. He says: "The Tudor period in strict historical parlance ought to be confined within the limits of the reigns of Henry VII and of Henry VIII and his three children, that is to say, from 1485 to 1603; but it is undoubtedly permissible to extend its consideration, so that the evolution as well as the development of a great building epoch may be appreciated. It is therefore proposed in these pages to go back to the closing days of Henry VI's reign, whilst it will also be well to note the occasional survival throughout the reign of James I. Thus it may be assumed that the early Tudor period extended from about 1450 to 1540, while its later development can be traced from 1540 through the first quarter of the seventeenth century."

It is interesting here to observe that the expression of the Renaissance in England was perhaps the least classic of all countries (in spite of importations of Italian designers) and as a matter of fact, that it was probably during the reigns of Henry VIII and his children that England first began to grasp something which, stylistically, was to be most intimately and exclusively her own.

THE DOMESTIC ARCHITECTURE OF ENGLAND DURING THE TUDOR PERIOD. By Thomas Garner and Arthur Stratton. Second Edition, Revised and Enlarged. Two Volumes. 237 pp. and 210 Plates, 12 x 15 ins. Price $65. Scribners.

ARCHITECTURE and decoration as well as manufacturing in countless forms are dependent upon design to a much greater extent than is generally realized. For this reason there exist many schools of design wherein students are trained to exert their skill in designing not only ornament to be used in connection with architecture and interior decoration but likewise for the use of the weavers of textiles of every sort, for the carvers of wood, the workers of metal in countless forms, for the makers of jewelry and workers in other fields; and there exists what might be regarded as an entirely separate department of the subject as it applies to costume. Wholly apart from the training given in classrooms there are, for the help of students, the masterpieces of the past, for even today after all the wars and other catastrophes which have afflicted the world, there are the records, vast in extent, of what the designers of every age actually wrought. Added to the not inconsiderable remains of what still exists from prehistoric ages, there is the great wealth which was bequeathed to later ages by the classical countries,—Greece and Rome,—and the legacy from later periods becomes

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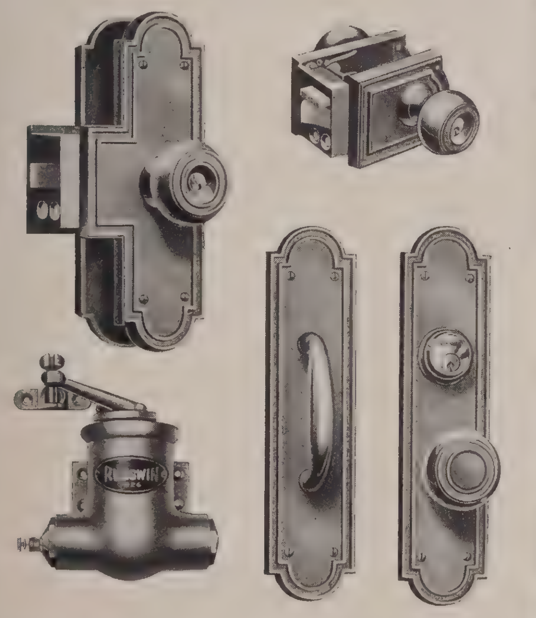

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bewildering, since every race developed design in ways differing greatly from those which characterized the design of other races. To examine in person even a tiny portion of this rich store,—and notwithstanding the great help afforded by the collections in museums,—would require traveling for years over the greater part of the inhabited globe, and the student must perforce rely for aid upon design available in illustration. For this reason the scholars who study design and who publish works dealing with the subject deserve well at the hands of students present and future.

In his preface to this excellent volume, R. Phene Spiers says: "The first German edition of this work was published in 1904 and met with such signal success that its author, Herr Alexander Speltz, was called upon to bring out a second edition two years later. In this edition the number of plates was increased from three to four hundred, which enabled the author to give a more complete representation of ornament as developed in England and America than had been at first contemplated. The original work was undertaken with the object of representing the entire range of ornament in all its different styles from pre-historic times till the middle of the nineteenth century and to illustrate the different uses to which it had been applied. The whole of the illustrations, which were taken from the best authorities on each subject and period, were drawn specially for the work and evince the remarkable industry and knowledge of the author and his artistic power in representing ornament. In fact it is only necessary to glance through the several plates to see how closely the author has caught the style and character of each period. Acknowledgments of the sources are made throughout the work, and in addition a special list of books of reference, including those which have been drawn upon for illustrations, has been inserted at the end of the volume.

"An English edition was published in America in 1906 for sale in that country only, but the historical accounts were not in accordance with the latest research, and many of the descriptions to the plates had suffered so much in translation that very considerable revision was necessary in preparing the present issue. Three new plates of English Ornament have been added to this edition, taking the place of others which it was found necessary to delete. Various changes have also been made in the headings to some of the chapters and in the terms employed, more particularly in the section devoted to the Renaissance period; for instance the term 'Barocco,' which although well known and recognized throughout Germany is but seldom used here, has been replaced by 'Later Renaissance' which is more familiar to the English student and includes that which used to be known as the pure Italian style introduced by Inigo Jones. The term 'Rococo' has been retained, as it would have been difficult to find any other to suggest the vagaries of the Louis XV style which spread through Italy, France, Spain, Germany and Flanders and in England led to Chippendale's work; the terms adopted to distinguish the later periods are adhered to as in the original edition.

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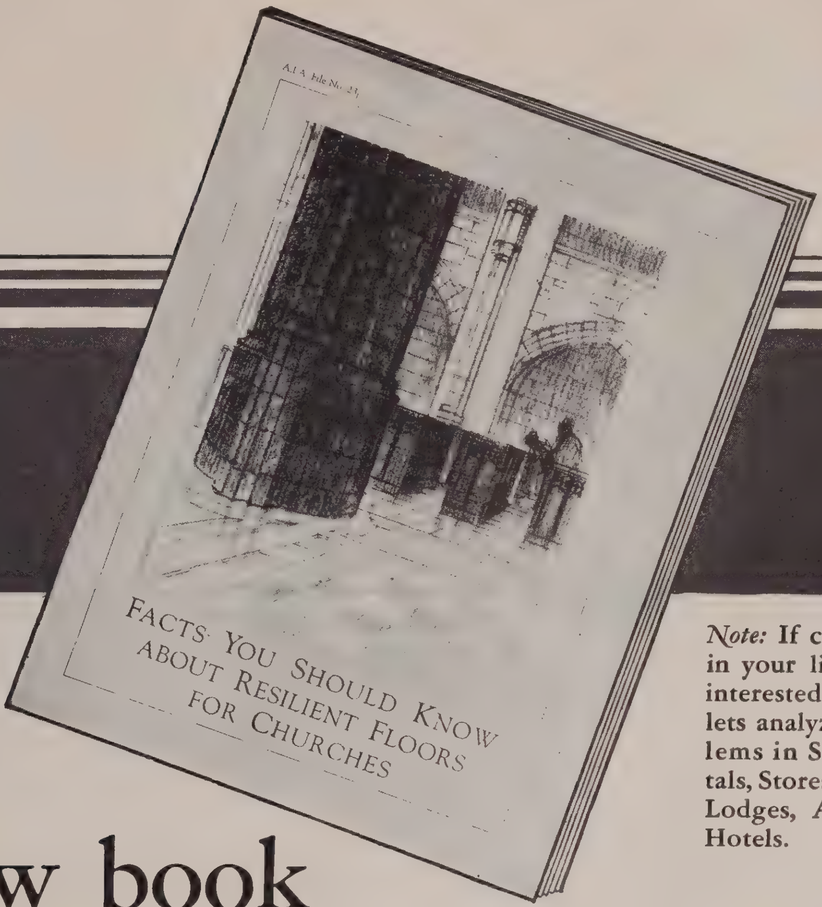
STYLES OF ORNAMENT. By Alexander Speltz. Translated by David O'Connor. 647 pp., 6 x 9 ins. Price $6. Regan Publications, Chicago.



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THIS work was originally published in 1902 under the title of "The Architecture of Greece and Rome," by William J. Anderson and R. Phene Spiers. The book was projected by William J. Anderson, of Glasgow, who intended to write the text from a series of lectures on the history and development of Greek architecture, and the lectures he was preparing upon the history and development of Roman architecture. He died, however, before his intention was realized, and the work was placed in the hands of Mr. Spiers. It was deemed advisable in this revised edition to have the work as thorough as might be necessary in order to make the text more useful to students and to embody the latest results of excavation and research. Therefore, this revised edition, "The Architecture of Ancient Rome," deals exclusively with the architecture of Rome, leaving to a companion volume the architecture of ancient Greece. Naturally, the subject matter has been much added to to bring it into accord with the results of research and study made in the interval, though the present revision retains many valuable features of the original. The work is handled in a scholarly manner, with conscientious care devoted to chronology; when doubts or divergent opinions exist as to dates or names of structures, they are candidly expressed and the opinions of authorities are quoted with the present author's criticism or approbation. At this time it is exceedingly difficult to ascertain the periods to which many structures belong, owing to the critical examination which is being carried on of materials and methods of construction peculiar to the various periods. Thus research has entered a new phase and has upset classifications hitherto accepted.

A fault of this splendid work, one feels, is a fondness of the author for involved sentences. Frequently they require careful analysis to determine the meaning, and even then the reader is often left in doubt. This is a fault which is likely to bore the student, and it tends to making reading of the text laborious. The subject is dealt with in a chronological way, through Republican Rome up to the Imperial period, after which the various structures are dealt with in the classifications to which they belong. First, however, comes a studied chapter on materials and construction, on which the author lays great stress.

Chapters VIII and IX deal with palaces and houses and with private life among the Romans and are the culminating and most interesting parts of the book. The most entertaining feature of these chapters tells of the houses in the town of Ostia, close to the mouth of the Tiber, where excavations still in progress are bringing to light the remains of a great commercial city, the ancient port of Rome. Here in the Casa di Diana we find a new type of house of ancient Rome. In plan and facade it has the characteristics of the Italian domestic architecture of today. It possesses an elevation of five stories, that over the basement story being a mezzanine floor; stranger still, the plan discloses that it is an apartment house, divided into independent floors and flats.

THE ARCHITECTURE OF ANCIENT ROME. By Anderson and Spiers. Revised and Rewritten by Thomas Ashby. 500 pp., 5 x 8 ins. Price $7.50. Charles Scribner's Sons.

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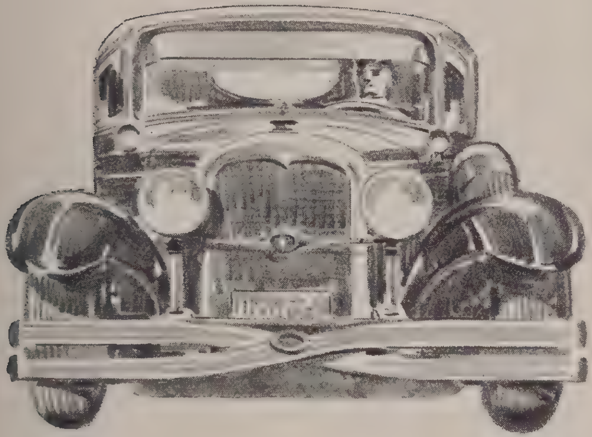

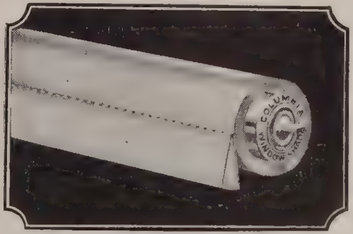

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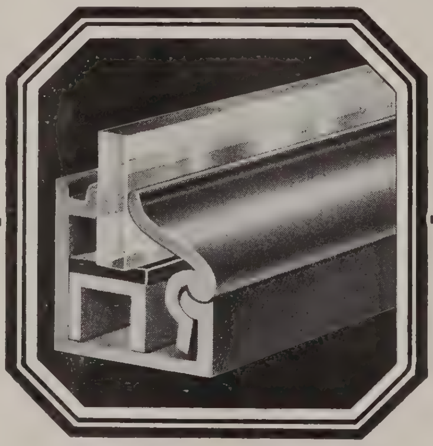

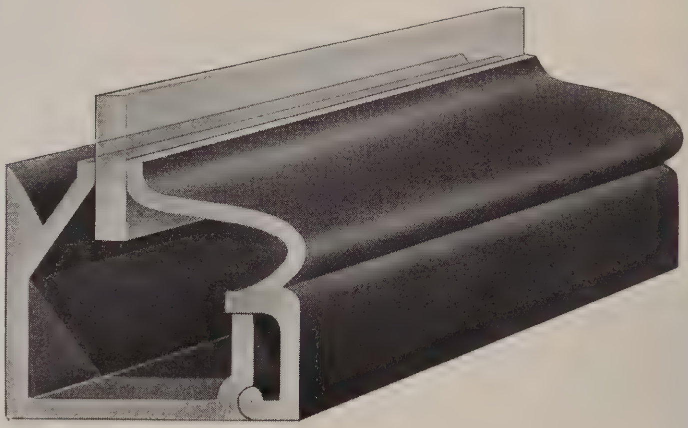

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It might not be amiss to briefly state here the ideas and the ideals upon which National Trade Journals, Inc., was brought into existence a year ago. To do so will explain to its friends why and how The Architectural Forum is today better situated to produce an even more interesting and serviceable publication for the subscriber, and in turn a more productive medium for the manufacturer to include in his sales program. In step with the trend of all business today, it was realized that business publications, to render complete service, should have their individual direction and ideals backed by the resources and financial strength which only group publication affords. To this end, twelve publications were first acquired, and National Trade Journals, Inc., organized in March, 1928. Since then seven other publications have been purchased and consolidation of some journals effected within the company. The organization of publishing groups within National Trade Journals, Inc., was one of the major ideas conceived in forming the company. This was followed religiously, and today every journal adds to its own strength the strength of the group. Segregation into groups brings together magazines serving similar fields, and makes possible editorial coöperation between the various journals in each group. Concentration of effort, consolidation of mechanical departments and centralization of executive control, insure the production of better magazines, improved contents and added circulation.

As organized and arranged, there are four groups of magazines and the nucleus for a fifth, comprising National Trade Journals, Inc. These are National Building Publications, National Food Products Publications, National Diesel Publications, National Sports Publications, and a National Textile Publication. The publications which make up National Building Publications are The Architectural Forum, *Building Age and National Builder, Good Furniture Magazine, The Heating and Ventilating Magazine, Home Builders Catalog,* and *Cement, Mill and Quarry.*

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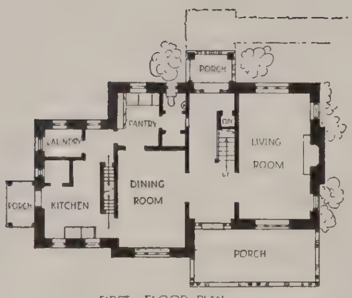

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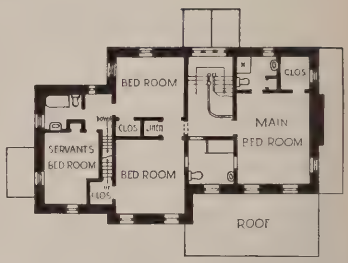

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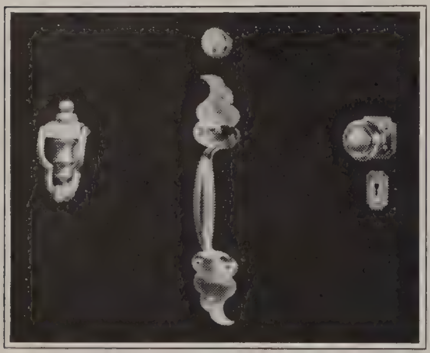

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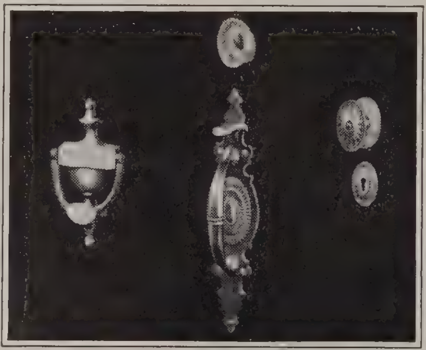

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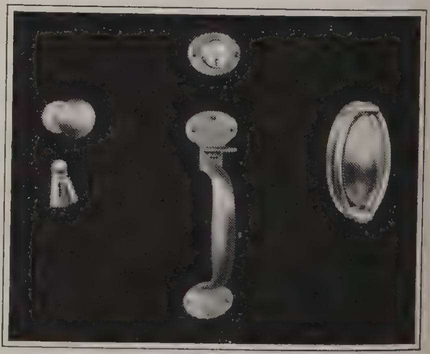

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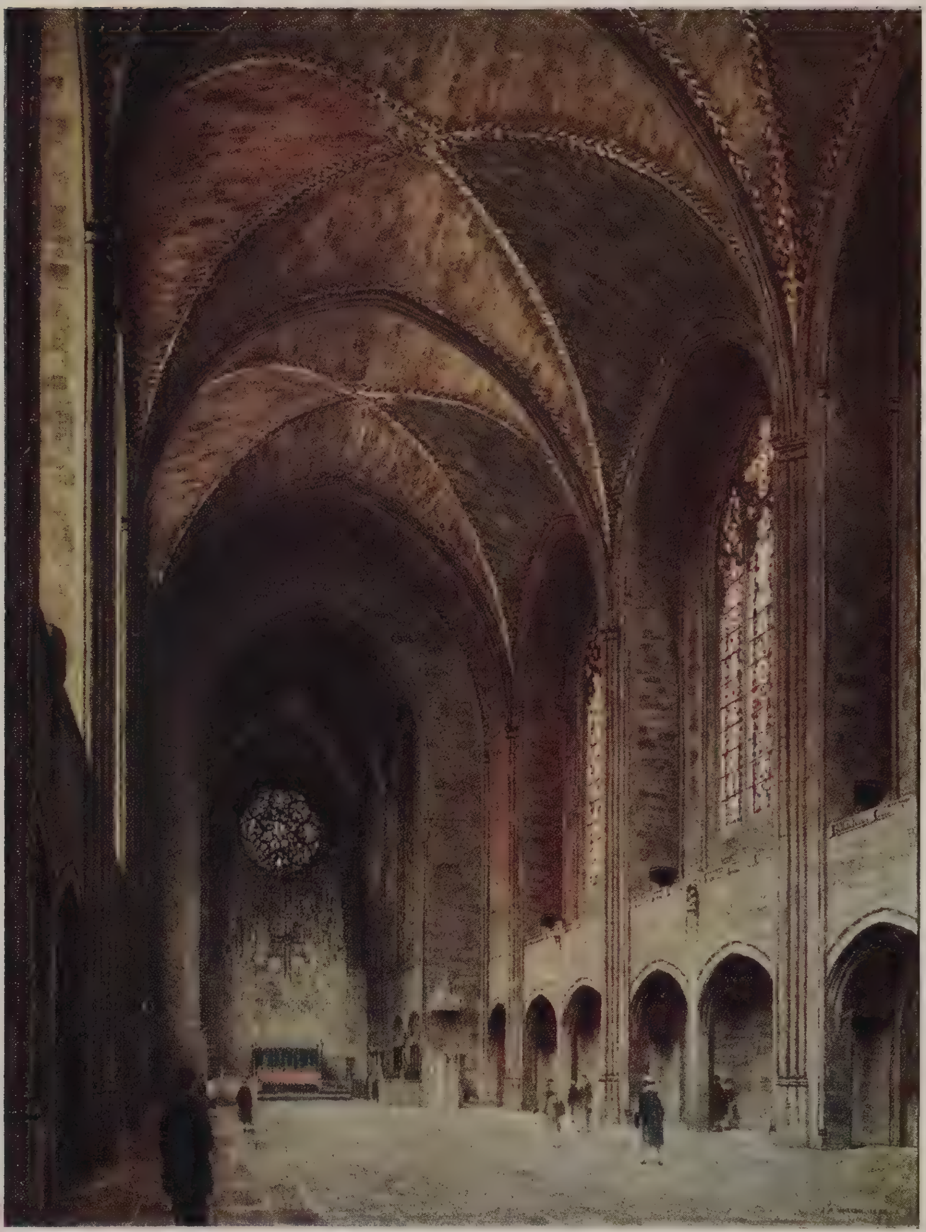

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FORUM

VOLUME L

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DECADENCE OF FRENCH CHURCH ARCHITECTURE

BY

RALPH ADAMS CRAM

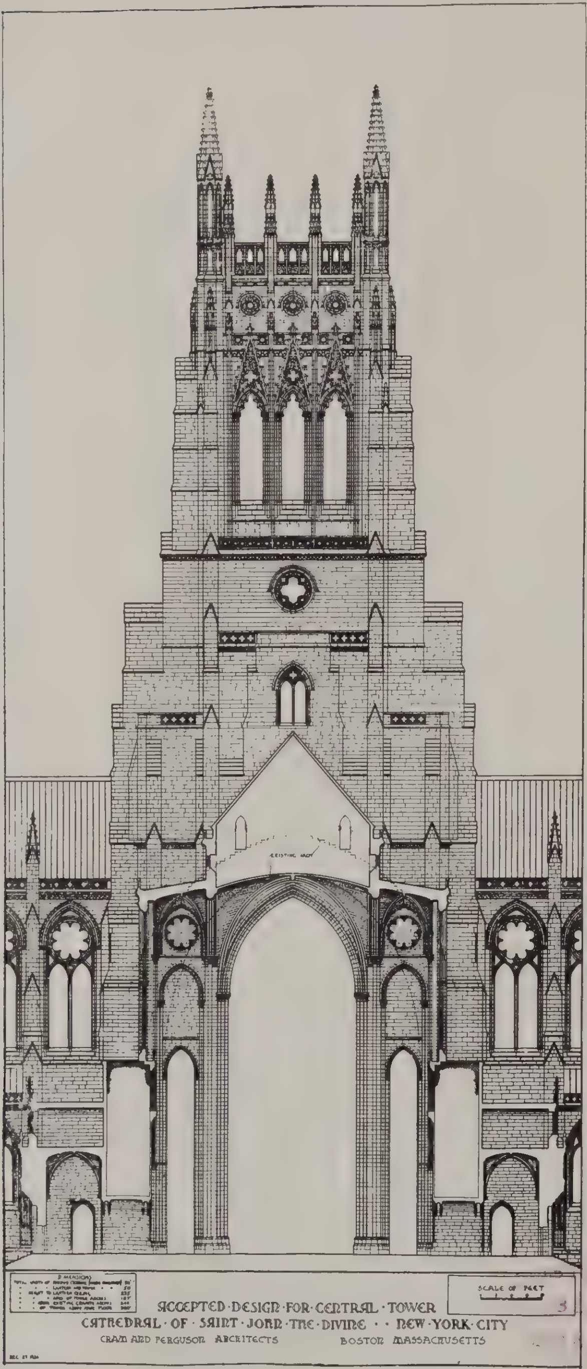
WHEN the Reformation established itself over the half of Europe and the Renaissance over all, religious art of every kind,—except music lingeringly,—ceased to exist. Sporadically the now wholly secularized art showed itself in the gorgeous and lawless Baroque of the South, and in the dry formalities of Jones and Wren in the North, but even these passed, and the last flickerings of an uncertain flame glimmered in the Puritan Colonial of New England.

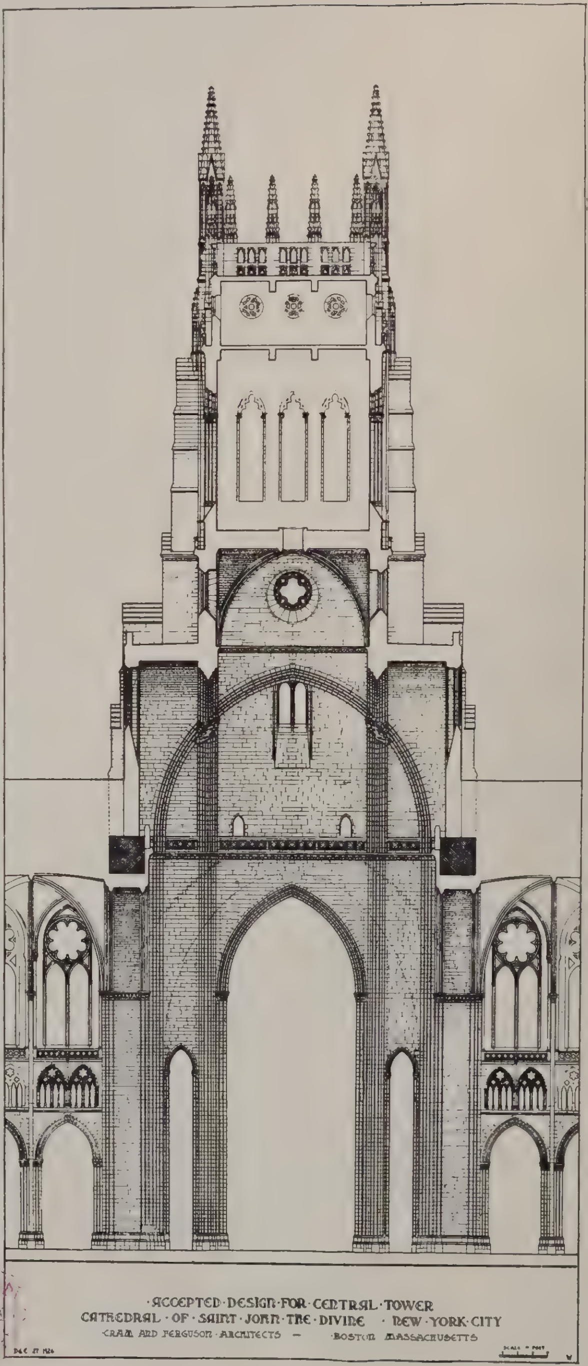
The worst tragedy of all, in architecture, was France. The perfect expression of the Christian religion and Christian civilization was born here, grew to its culmination, and left for the spoliation of Huguenots and Revolutionists and the wonder of later generations some of the greatest and noblest works of man. Spain flashed staggering triumphs of Gothic, and England quietly produced gentle Gothic loveliness, but in this particular field France still reigned supreme. And after the last tumultuous frenzy of the Flamboyant that followed the horrors of pestilence and English invasion, and the sophisticated Italianism of Francis I,—nothing. The country that had been delivered of Notre Dame, Reims, Bourges and a hundred other masterpieces could only offer the Pantheon, the Invalides, the Madeleine. The romantic movement struck out something when it developed in England in the early nineteenth century,—a premeditated recovery of Gothic, archæological and doctrinaire, but with flashes of real enlightenment and creative genius that did it more than credit and which has now engendered an equal energy of recovery in America; a movement that has culminated in this century in as vital a thing as Liverpool Cathedral. Elsewhere nothing; nothing in two centuries, except the academic ineptitudes of the Sacre Cœur in Paris and the preposterous but abortive Sagrada Famiglia in Barcelona. Of painting and sculpture there is nothing to say.

What are the influences working today toward a possible recovery of the arts in their association with religion, and particularly the primary and coördinating art of architecture? The English movement engendered by romanticism, fostered by the Catholic Revival, and given first form by the Pugins, was vigorous and beneficial. It appears largely to have lived its life, blossoming at last in such supreme work as that of Sir Giles Scott. Italy has nothing to offer along any line of religious art and has had nothing for three centuries. The same is true of Spain, for the Catalan calamity was a purely individual aberration and it will go no further. There are signs there, however, of a recrudescence of vigor in painting, sculpture and some of the artist-crafts. Germany, Holland and Scandinavia are stirring, but in religious art they cultivate a passion for doing something that is *different*,—it doesn't matter much what, so it is this,—and cut off absolutely from all tradition, all precedent. The result is always dull and in most cases appallingly ugly, —a sort of belated Protestantism in art. It is honest in the use of materials,—no ferro-concrete and terra cotta Gothic,—and this is something, though not everything, as its creators believe.

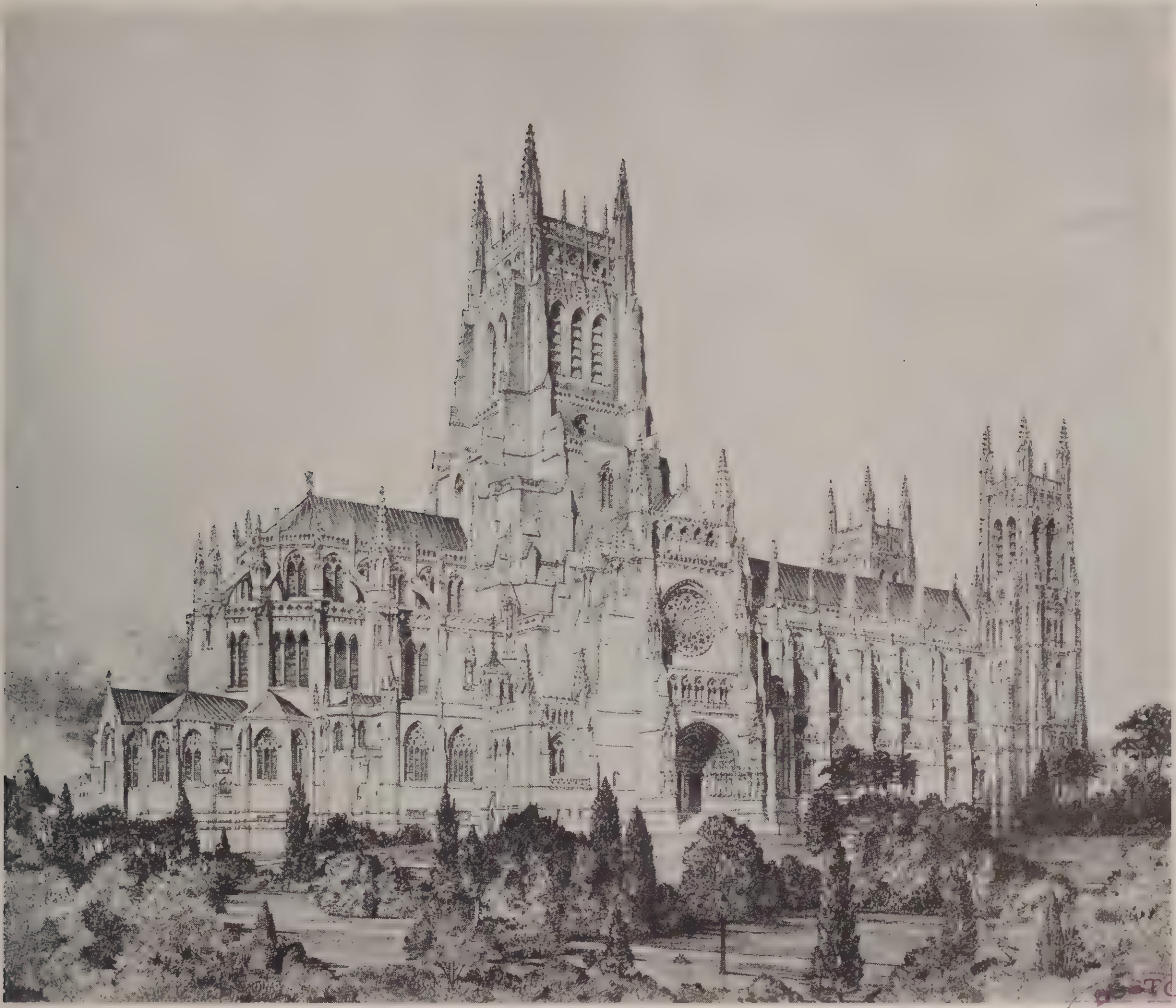
What about France? If there is little to hope for and nothing to fear from the rest of Europe, it is from France that the one danger projects itself. Perhaps it is not so serious a danger after all, for though the new mode is specious, logical so far as it goes, and particularly appealing to the mind that has thought a thing half-way through, and though the supporting propaganda is enthusiastic and vociferous and a few protagonists have already appeared in this country, the whole thing is clearly a part of an already out-moded fad of "modernism" in the other arts, and it is doubtful if it gains any foothold before it joins Cubism and the other indiscretions of senility in the oblivion of history.

It is doubtful if anyone here realizes how wrong-headed and impossible this new type of "religious art" actually is. Of course, we have always known that since the Revolution there has been in France no art that in any sense linked itself with Christianity of any mode, whether Catholic or Protestant. If a church were built it was of the ilk of that at Albert, mercifully obliterated


DIMENSIONS
SCALE OF FEET
ACCEPTED·DESIGN·FOR·CENTRAL·TOWER
CATHEDRAL·OF·SAINT·JOHN·THE·DIVINE··NEW·YORK·CITY
CRAM AND FERGUSON ARCHITECTS BOSTON MASSACHUSETTS


·ACCEPTED·DESIGN·FOR·CENTRAL·TOWER
CATHEDRAL·OF·SAINT·JOHN·THE·DIVINE ·NEW·YORK·CITY
CRAM AND FERGUSON·ARCHITECTS — ·BOSTON MASSACHUSETTS
DEC 27 1926
SCALE OF FEET

during the Great War, or of the Ecole des Beaux Arts interpretation of southern Romanesque inflamed by theatricalism, the supreme example being the Sacre Cœur of Paris. Gothic was seldom attempted, and fortunately, as the few living examples show, for the style was not recognized by the schools. In painting and sculpture and the artist-crafts the same thing was true. The standard was about that achieved here in America just after the war between the states. The last church produced in France that had architectural merit, even if it was without religious significance, was the chapel of the Invalides. For a century and a half religious art of any kind was simply non-existent. Now however, for some reason the nature of which does not appear, the situation has changed and with loud hosannas a small group of architects and other practitioners of the arts have proclaimed a new evangel. They have made the discovery (still withheld from our own architectural schools) that religion exists and that churches are built and, so to speak, embellished, and with Gallic logic, they have picked one minor item in the congeries of forces that operate in the



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Cathedral of St. John the Divine, New York
Cram & Ferguson, Architects

determining of an ecclesiastical fabric, and have raised on this insecure basis an entirely new creation, uncouth, without significance, a portent. If anyone has seen the designs submitted for a proposed shrine in honor of Ste Jeanne d'Arc at her place of martyrdom in Rouen, or some of those offered as memorial chapels on some of the battle fields of the western front, all "Gothic" in a manner of speaking, it is perhaps just as well that the Ecole des Beaux Arts and its *eleves* should have struck out into untrodden fields.

Exactly what has happened is that the French architects have suddenly discovered ferro-concrete and steel, and the revelation is too much for them. All recognition of higher or other values has ceased. Tradition, cultural continuity, significance, expressiveness, even beauty itself, all have gone into the discard, and nothing remains but the hard compulsion of one particular building material. With that logic for which the race is famous (and for the application of which it has several times been severely punished in the past), the present-day architect discerns at once the absurdity of couching the manifestations of big business, mechanical proficiency and a technological society in the æsthetic forms of earlier ages of utterly alien nature, and he proceeds to build his shops and garages and hangars out of the novel materials, in a style that has no style but fits the case perfectly, and is as genuinely ugly as would naturally and properly fit the case,—which is all very well and quite what it should be. These things are absolutely new; they have no kinship with any past. A "Gothic" skyscraper, a Renaissance power house, a Byzantine cinema are anachronisms. But it is just as dumb to build a Catholic church after the style and of the same materials as a hangar. Architecture must be expressive of the function and the energy behind it; if it isn't this, then no matter how logical it may be on the one hand or how archæologically correct on the other, it is nothing.

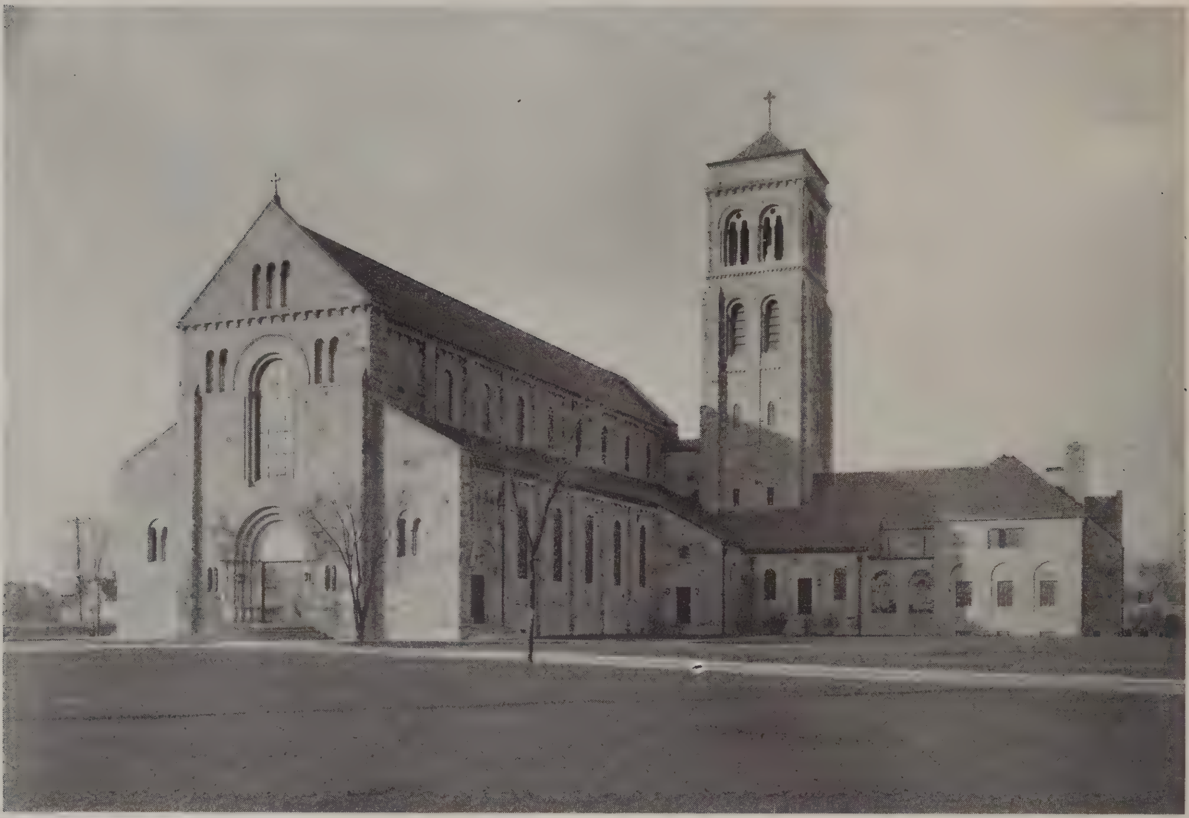
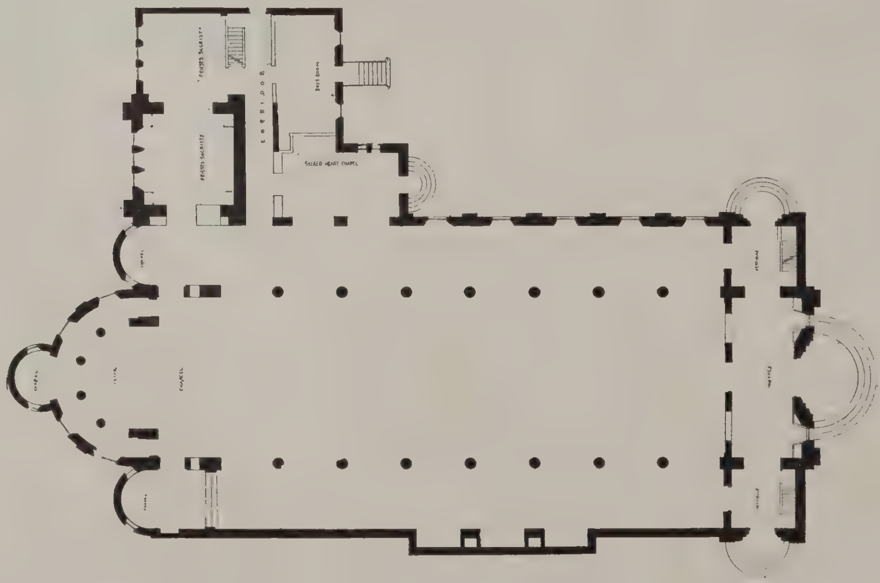
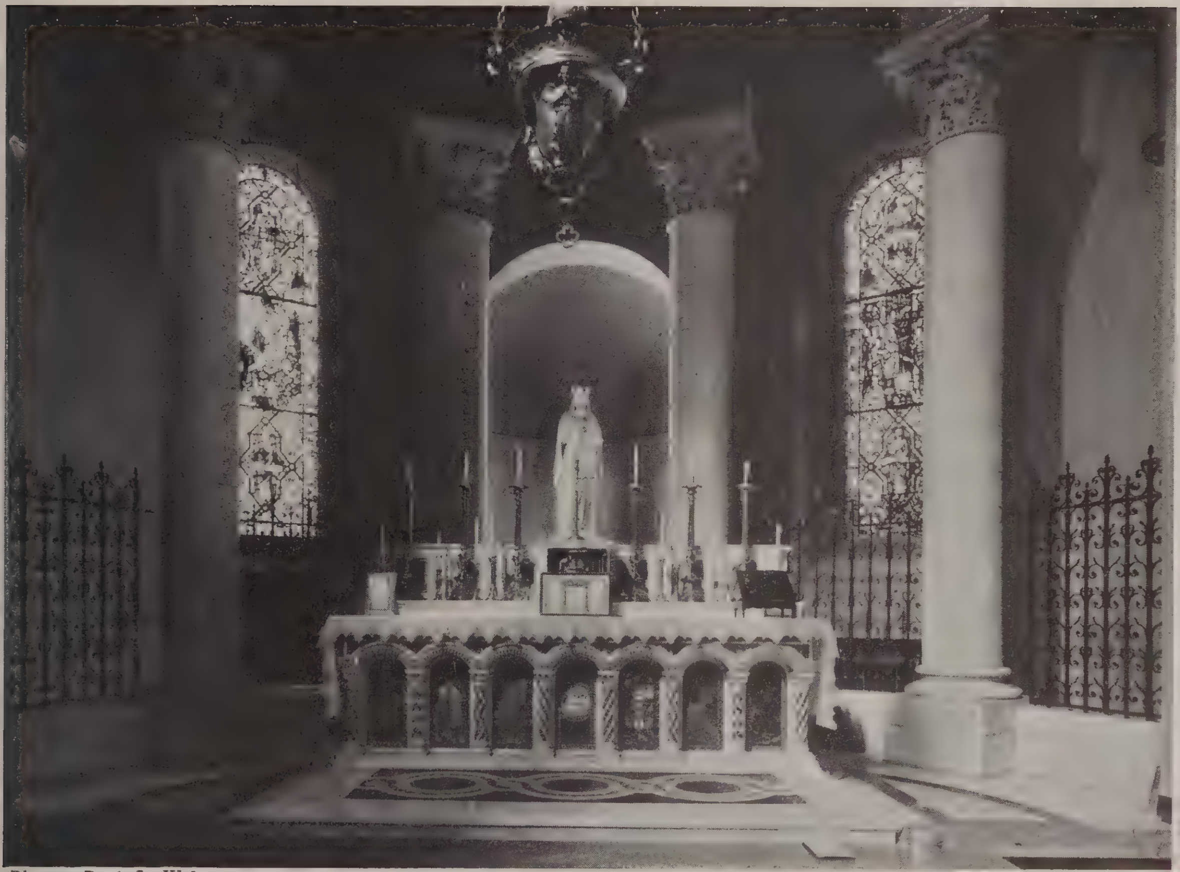


Photo: Thomas Ellison



FIRST FLOOR PLAN

ST. MARY'S CHURCH, DETROIT
CRAM & FERGUSON, ARCHITECTS
McGRATH, DOHMEN & PAGE, ASSOCIATE ARCHITECTS



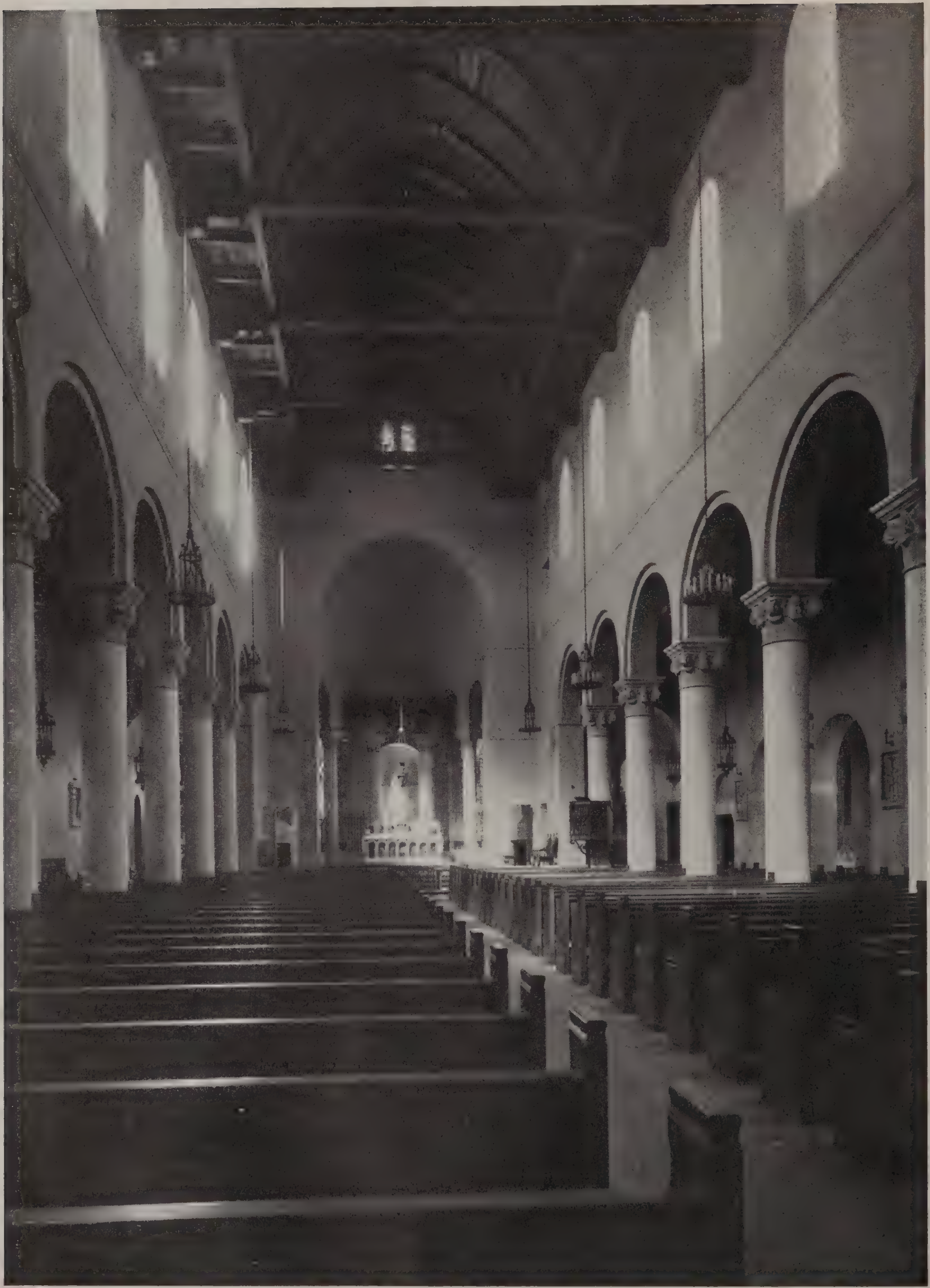
Photos. Paul J. Weber

ST. MARY'S CHURCH, DETROIT
CRAM & FERGUSON, ARCHITECTS

There is a unity underlying all religion, with the probable exceptions of some of its later and more uncouth manifestations. The Catholic religion has continuity and unity as a theoretical whole. Stylistic changes have been numerous,—six as a matter of fact in seventeen hundred years, depending on the impact and interplay of all manner of cultural and racial influences, but never has this sense of continuity been lost, though pretty badly strained as the last change in the sixteenth century. In any case it has always recognized beauty, demanded it, and got it, sometimes in full measure, sometimes to a lesser degree. From Byzantine to Baroque it *did* express the essential *ethos* of Christianity, and, in its varieties, the modifications in its superficial aspects that followed the impact of varying social moods.

For the reason that this "new art" is successfully expressive in the case of new social factors, therefore meeting one of the essential æsthetic necessities, it is utterly inexpressive in the case of old social factors such as the home, the school (non-technical) and the church. There is neither intelligence nor perception on the part of the architects who let a specious theory run away with them, betraying them into the sacrilegious absurdities of Catholic churches built of steel, reinforced concrete and plate glass, like Raincy or Montmagny. This sort of thing is bad enough when intruded into house building or school building, but in the case of religion with any historical basis and dogmatic continuity it is childish at the best, and demoniac at the worst.

As I have said before, I do not fear its influence in America. So far as I know only one church of this mode has thus far appeared, and itself demonstrates that it will probably be the last. For some reason that does not appear the last 25 years have seen religious architecture vitally restored and firmly founded in the United States. There has been nothing so good since the sixteenth century,—perhaps further back still. It is scholarly, beautiful and expressive; much of it is vigorous with real vitality and void of archæological pedantry, while it is the work of not one man or two but of about 30 individuals. When one thinks of what church building was 40 years ago, this seems almost miraculous. What it really indicates is that this is no sporadic episode, but a real re-creation of essential spirit, so convinced and firmly fixed and so widely distributed that it will prove immune to this new French infection.



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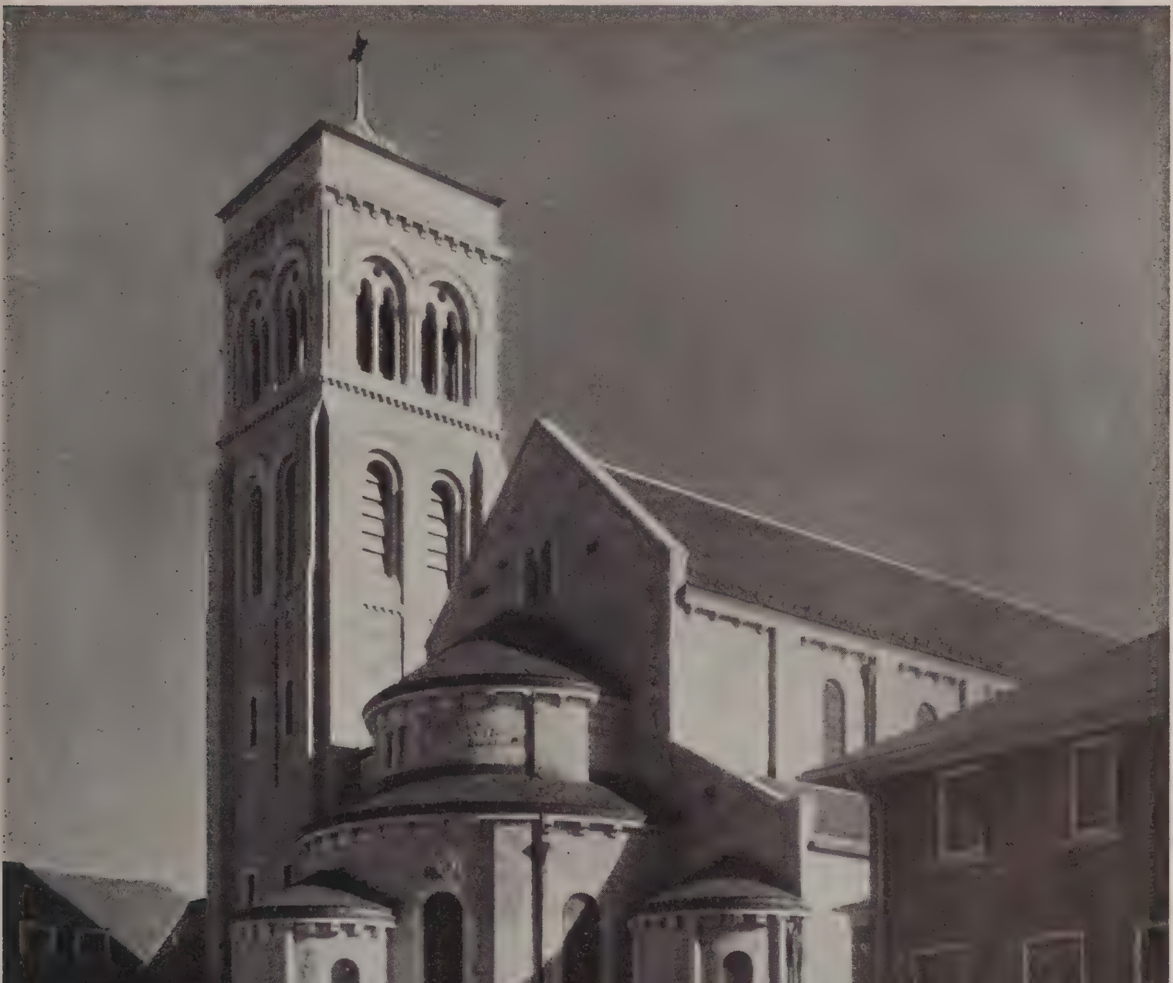
CRAM & FERGUSON, ARCHITECTS



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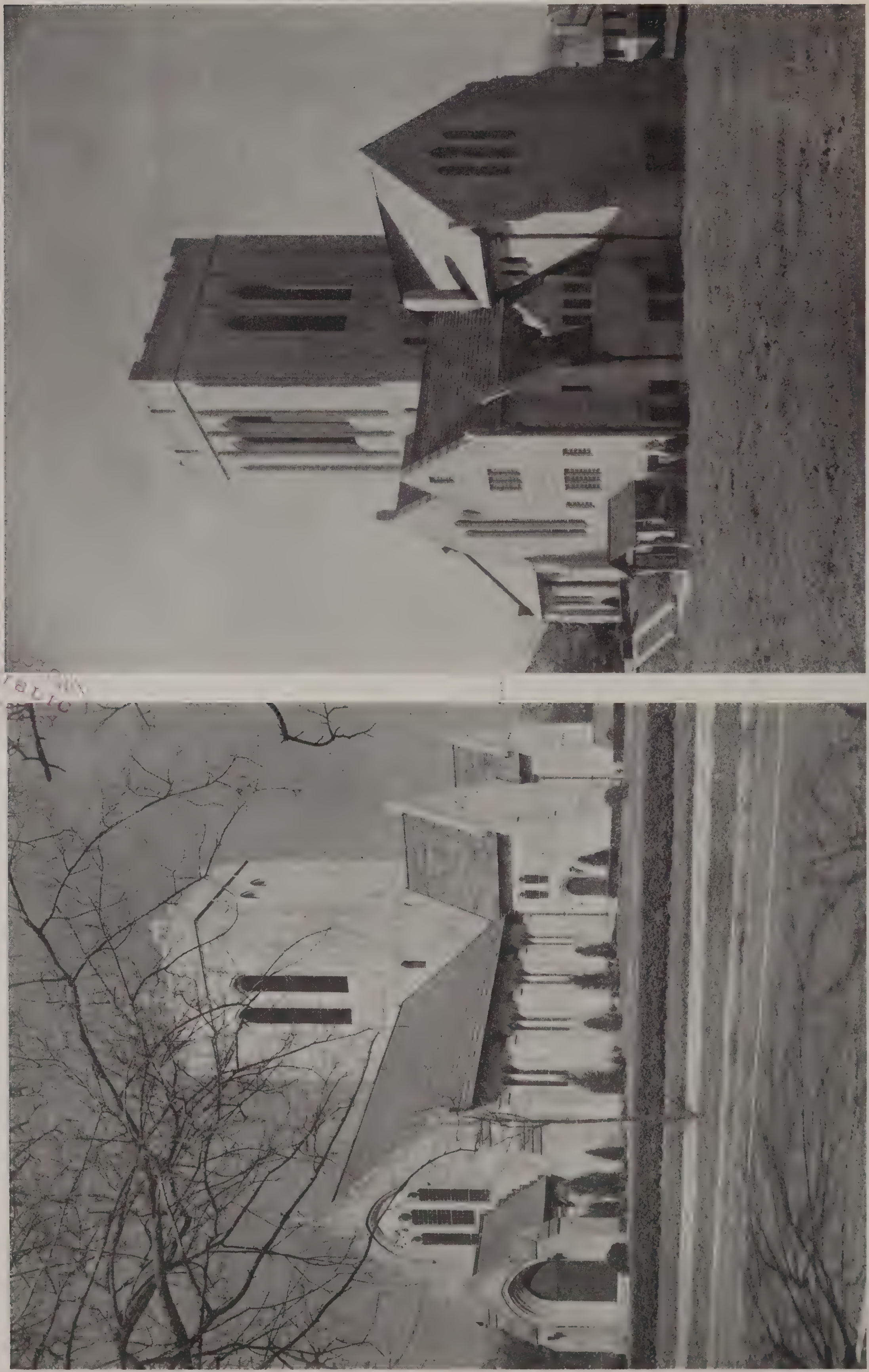
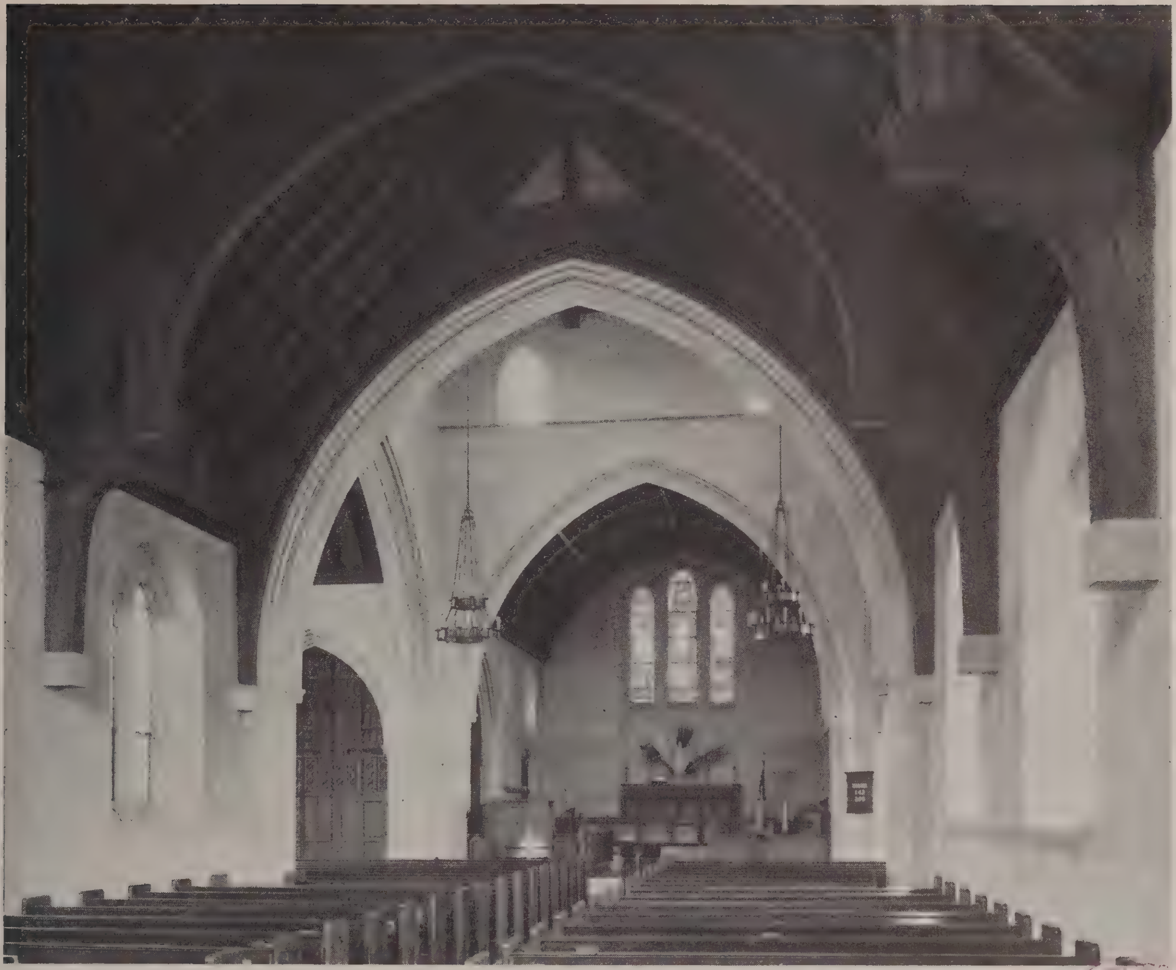
CRAM & FERGUSON, ARCHITECTS



Photos. Tebbs & Knell, Inc.

CHURCH OF THE ASCENSION, MONTGOMERY, ALA.

CRAM & FERGUSON. ARCHITECTS



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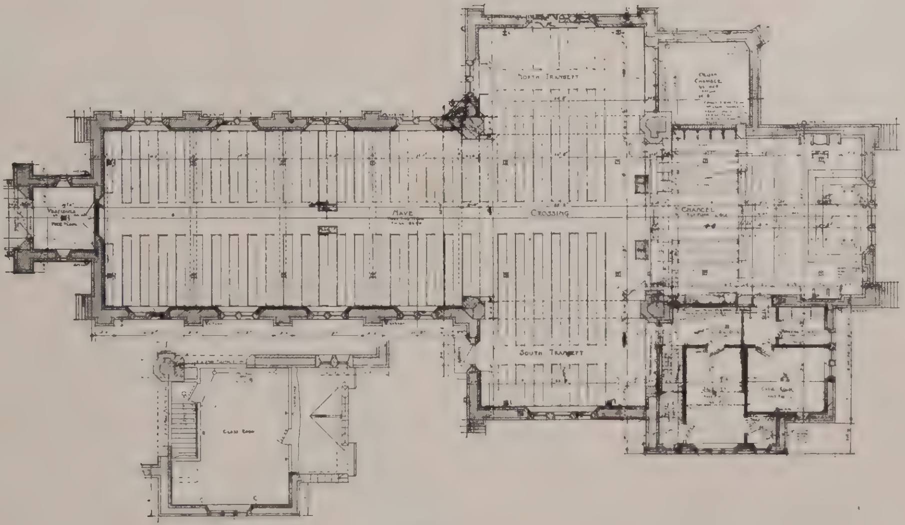
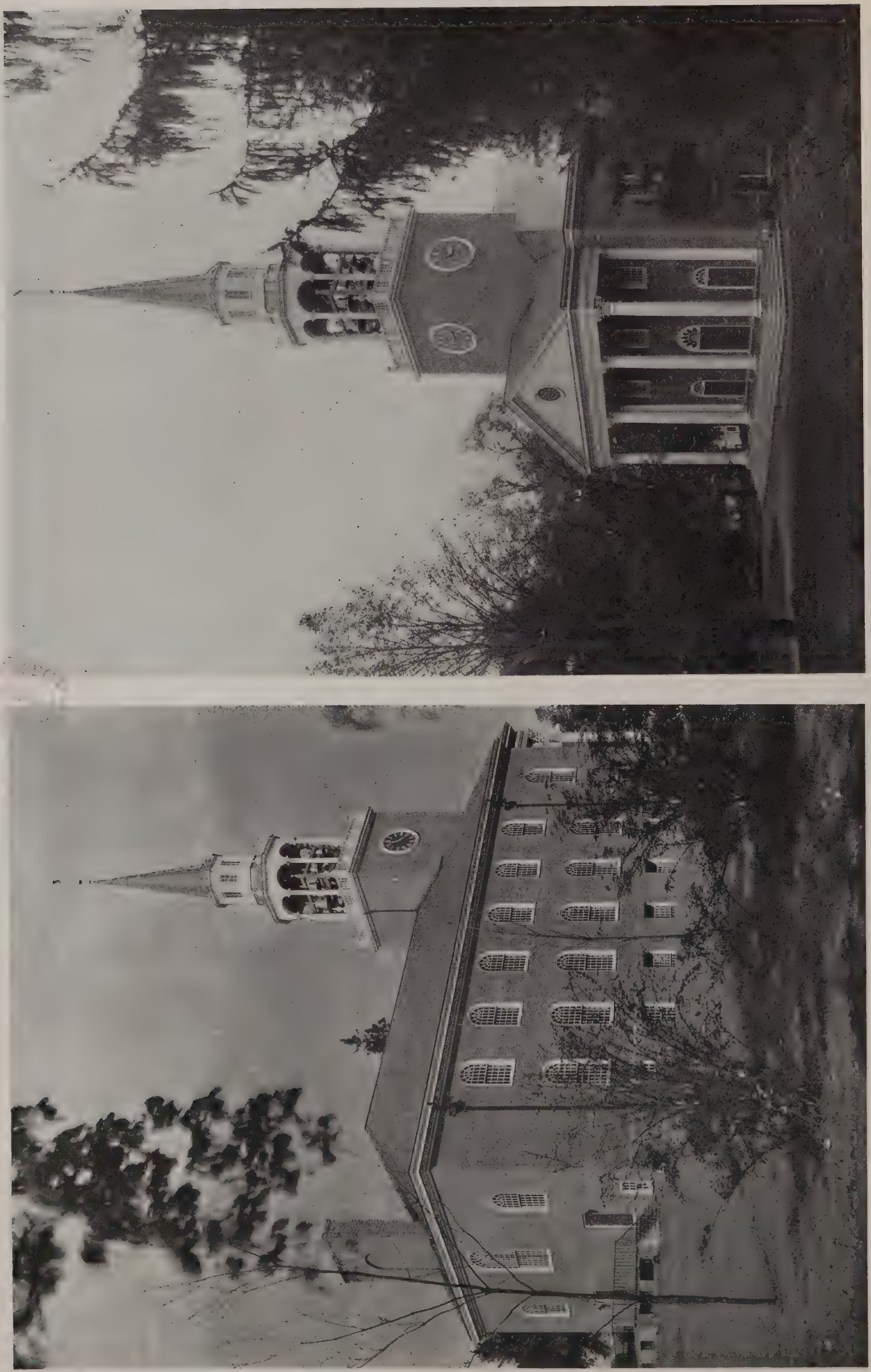


PLAN

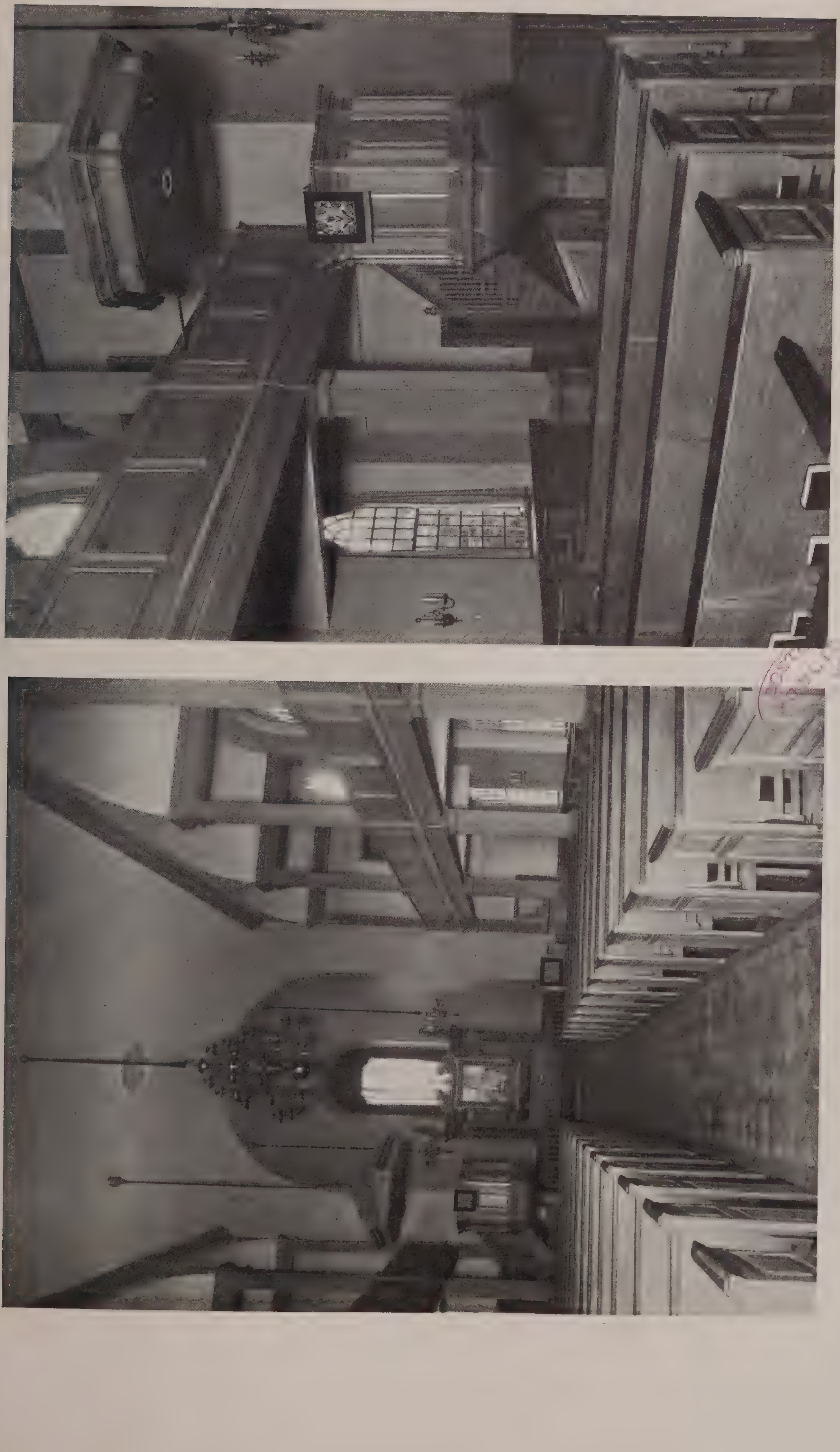
CHURCH OF THE ASCENSION, MONTGOMERY, ALA.

CRAM & FERGUSON, ARCHITECTS

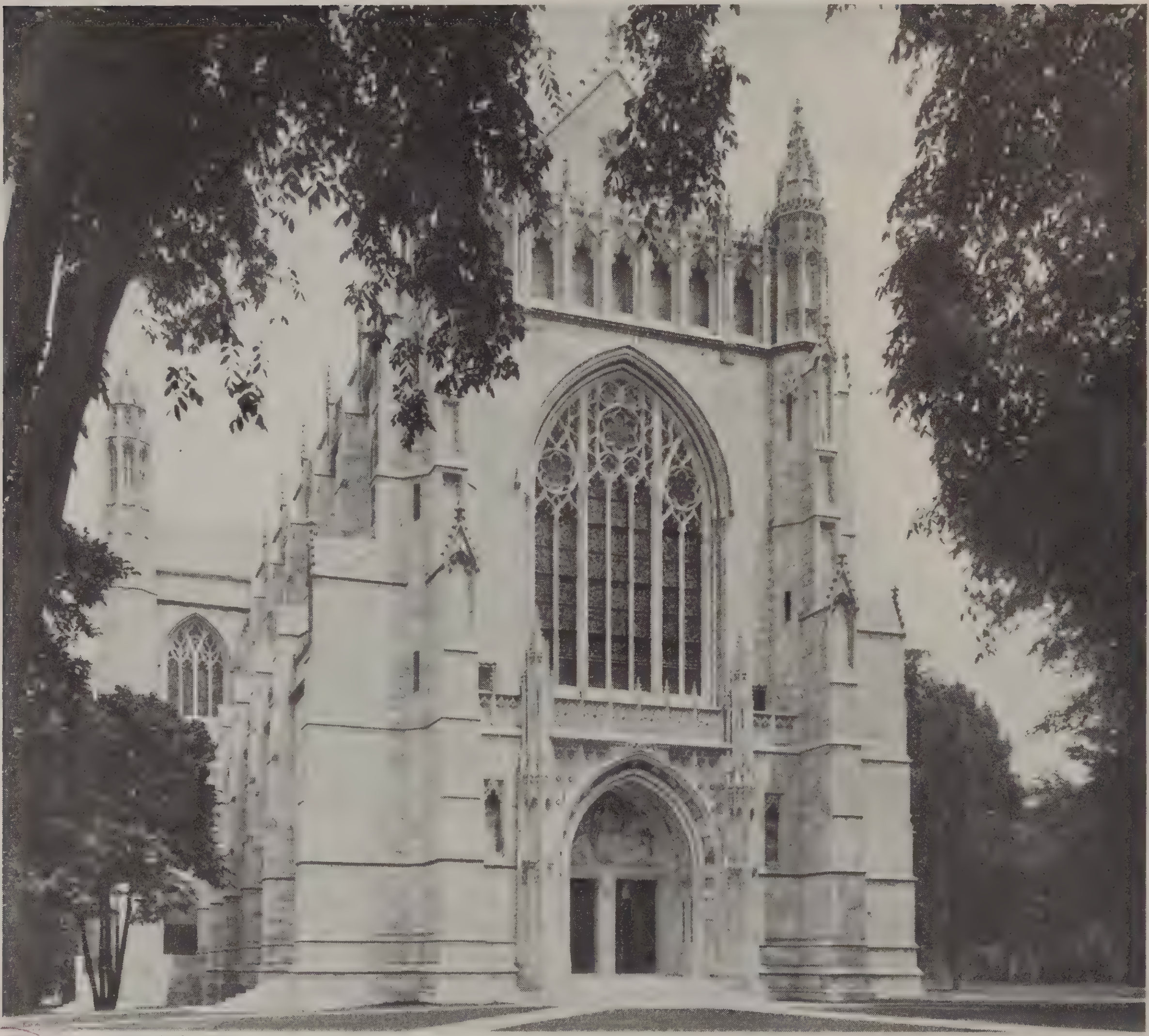


Photos. John Wallace Gillies

CHAPEL, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS

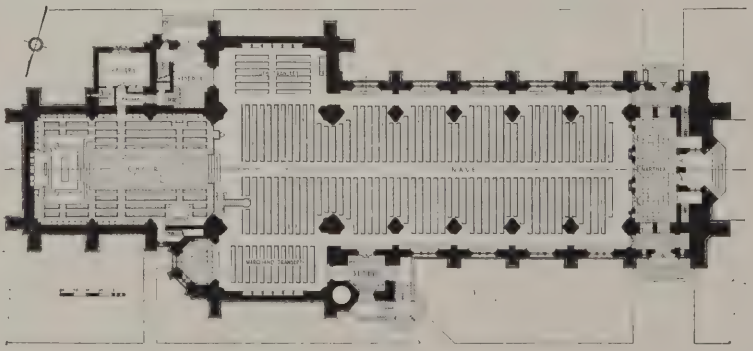


CHAPEL, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS



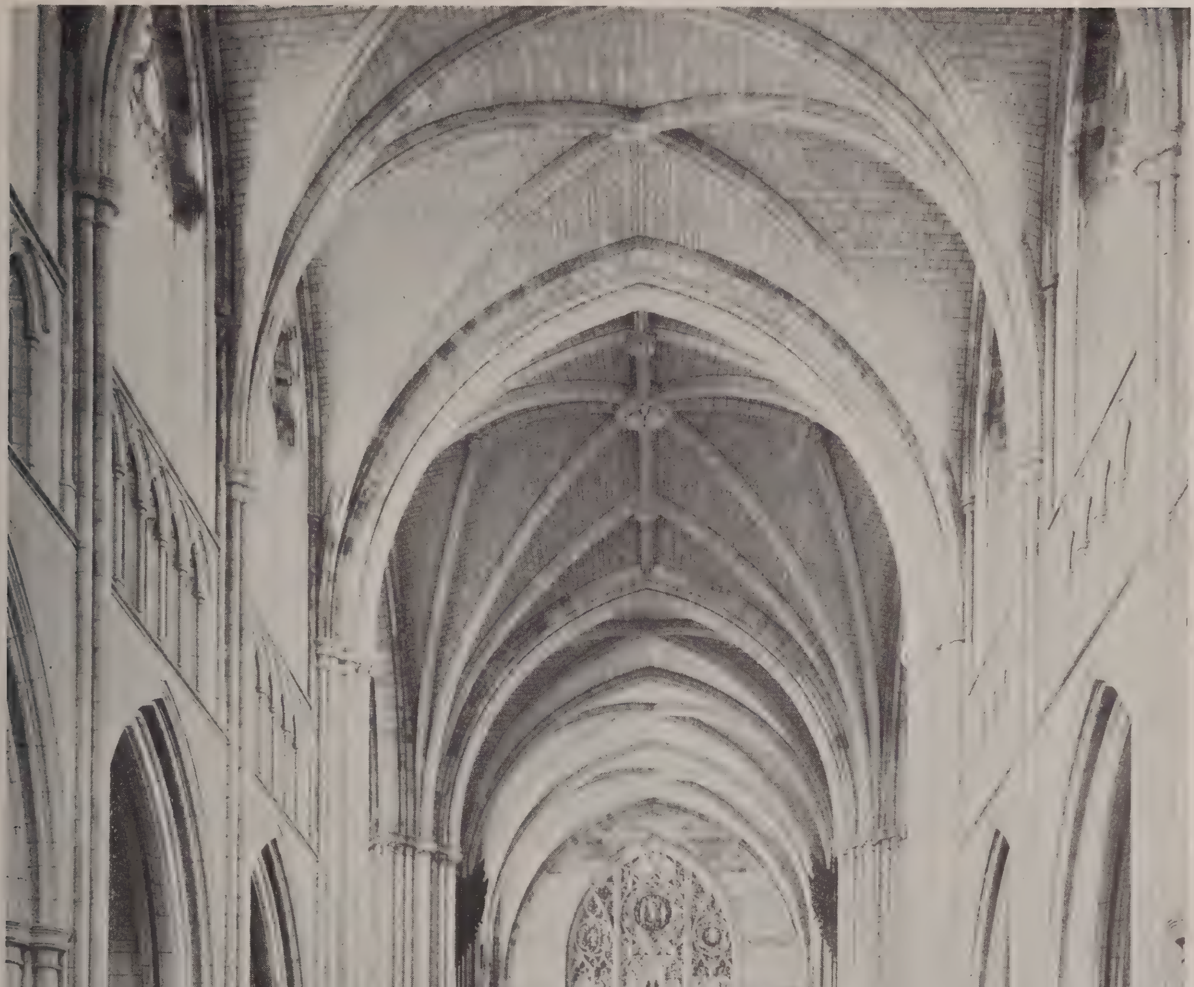
Photos. Sigurd Fischer

NORTHWEST ELEVATION



PLAN

CHAPEL, PRINCETON UNIVERSITY
CRAM & FERGUSON, ARCHITECTS



INTERIOR VIEW
CHAPEL. PRINCETON UNIVERSITY
CRAM & FERGUSON, ARCHITECTS

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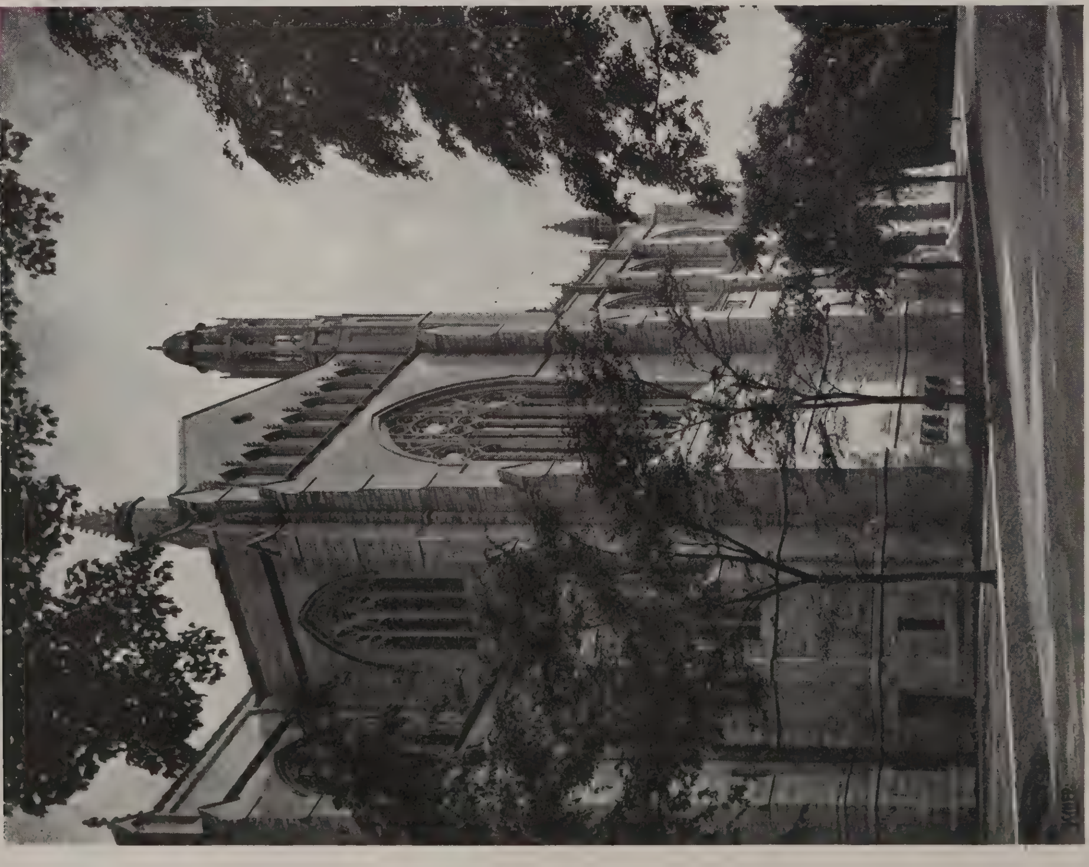
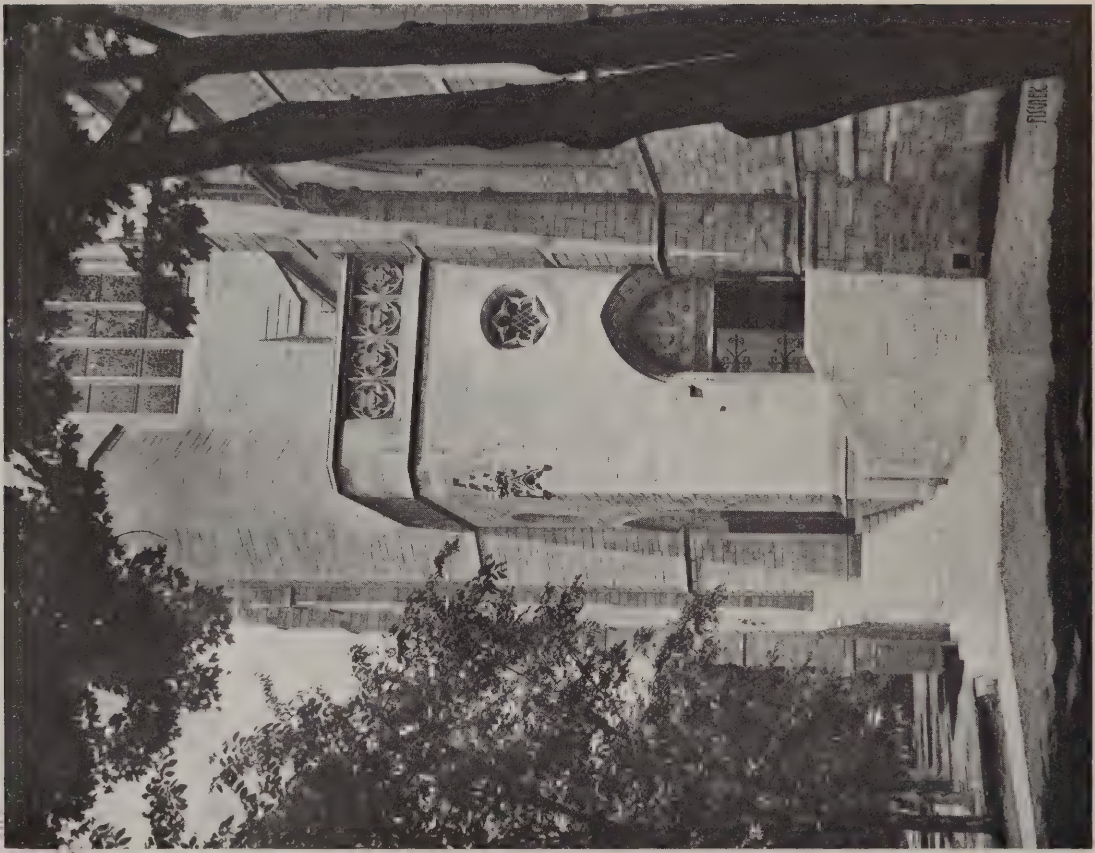


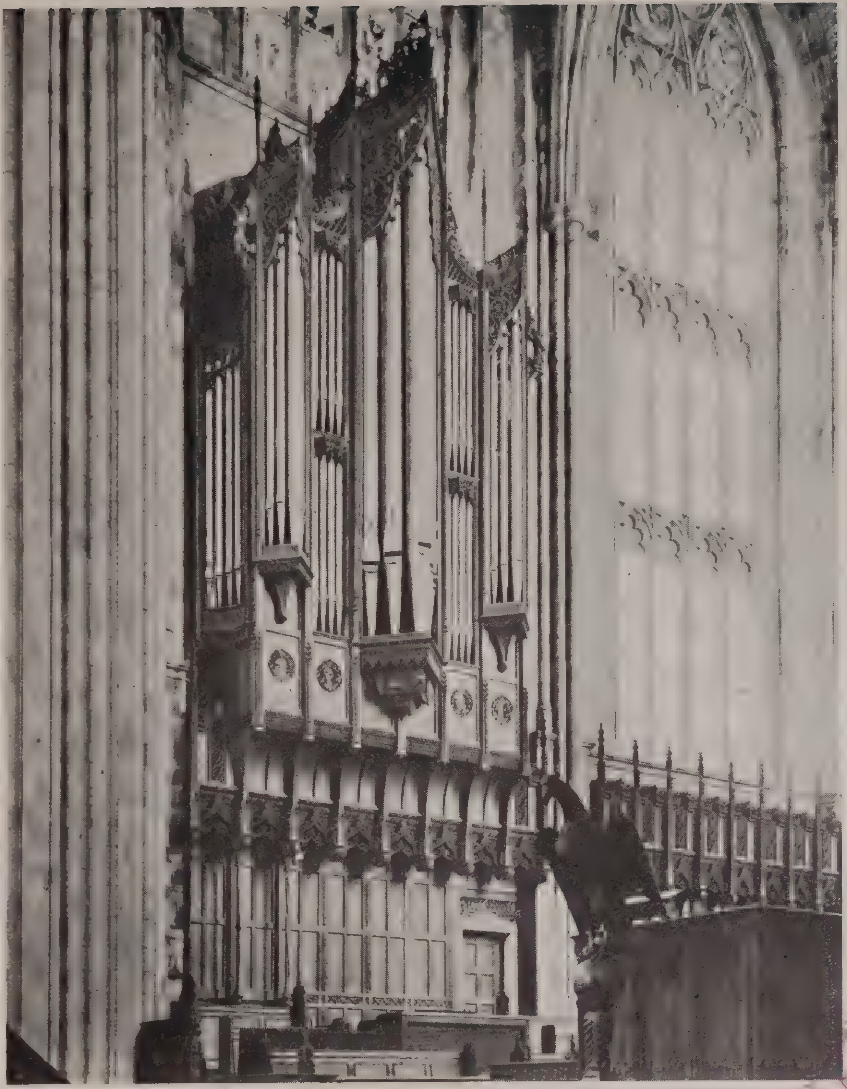
NORTHEAST ELEVATION



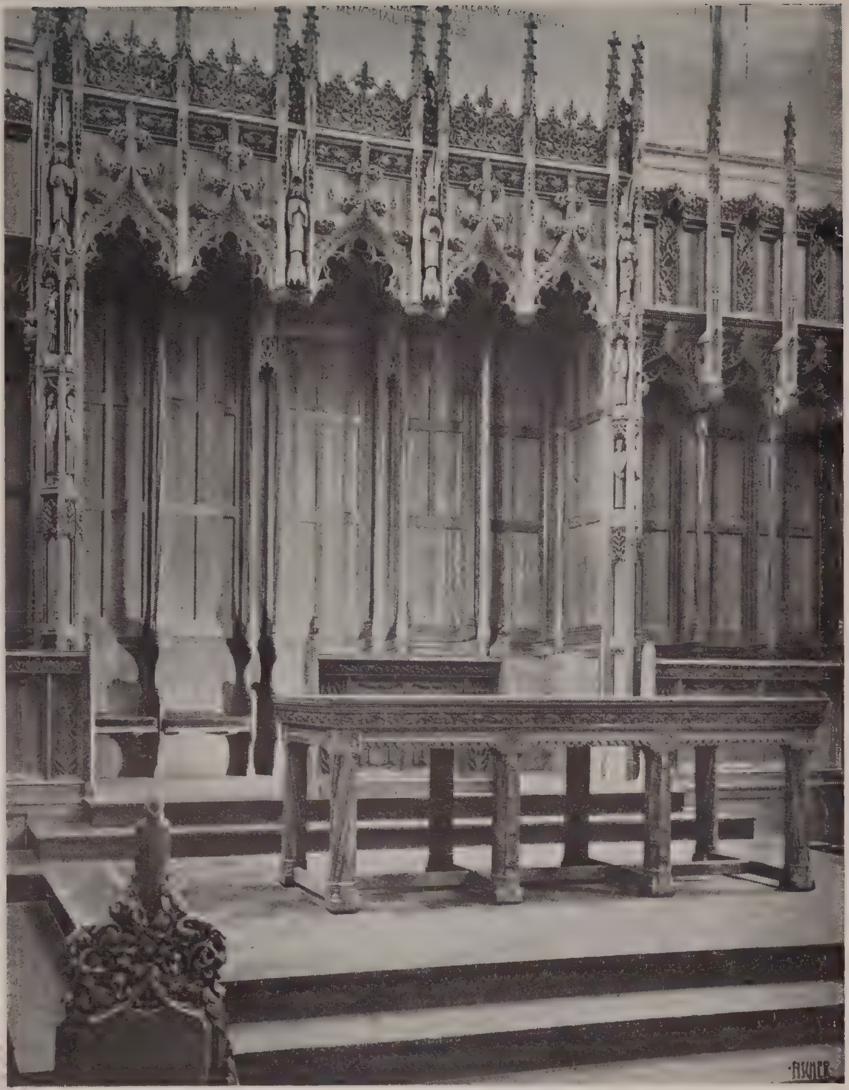
PORCH AT NORTH TRANSEPT

CHAPEL, PRINCETON UNIVERSITY

CRAM & FERGUSON, ARCHITECTS

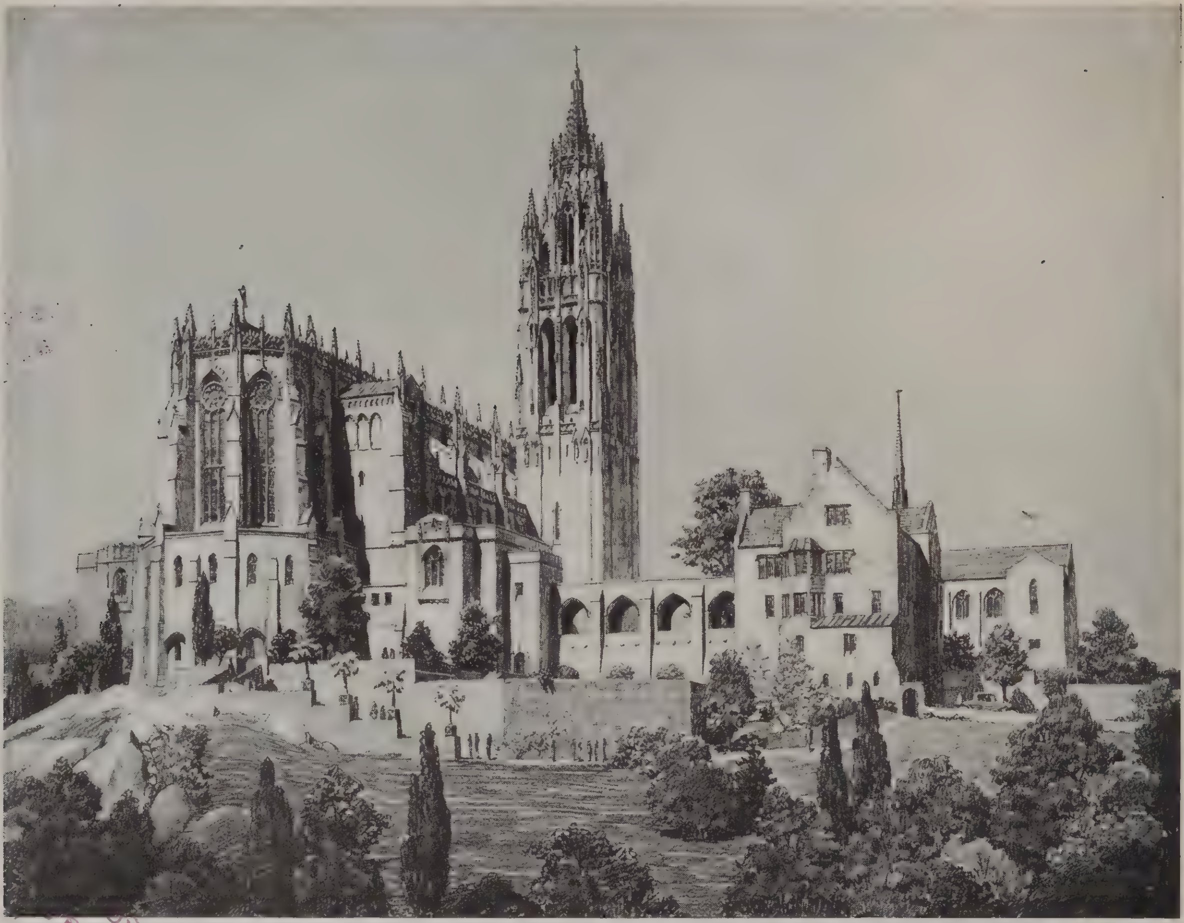


ORGAN CASE, NORTH SIDE OF CHOIR



COMMUNION TABLE, EAST END OF CHOIR

CHAPEL, PRINCETON UNIVERSITY
CRAM & FERGUSON, ARCHITECTS



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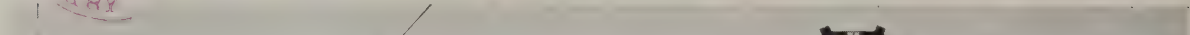
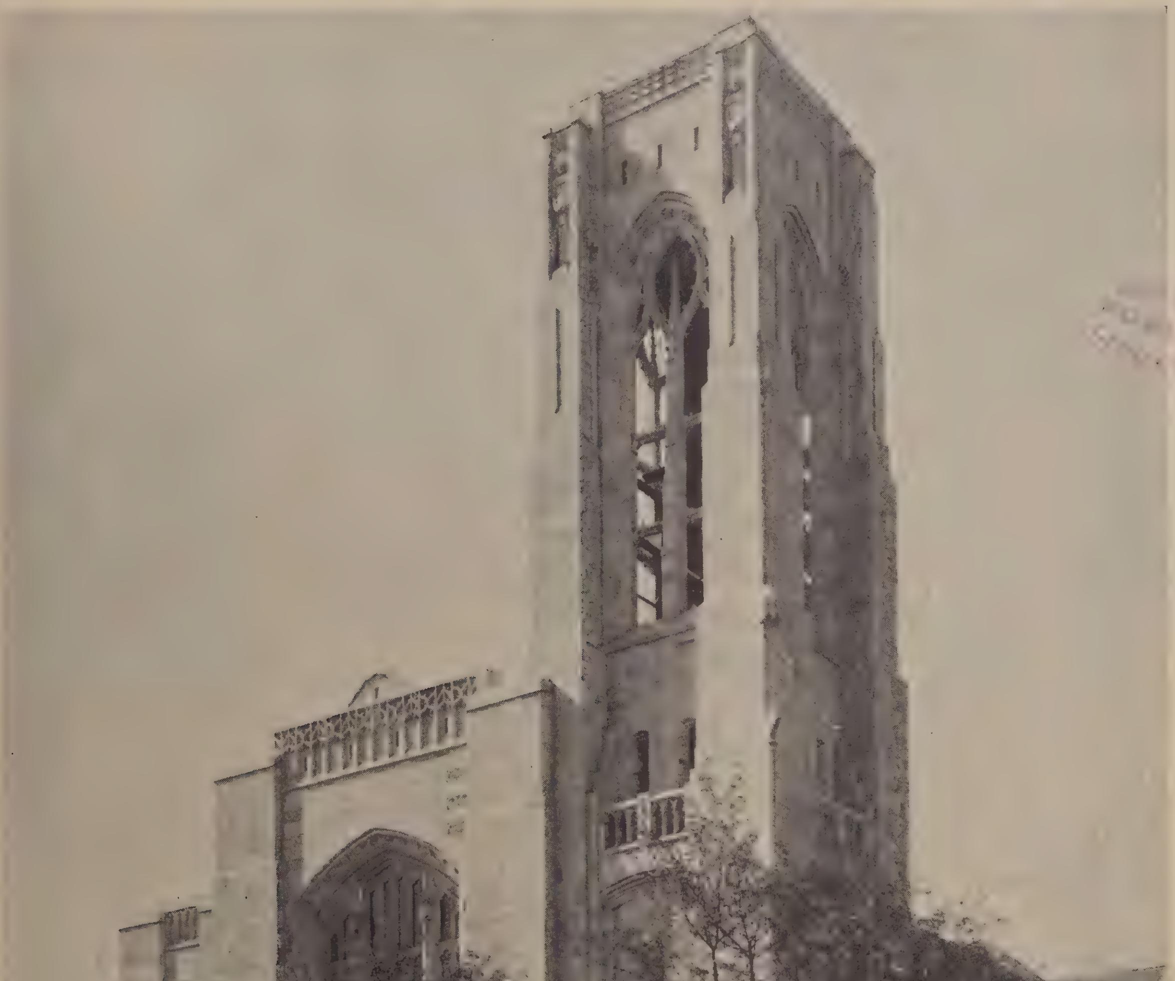


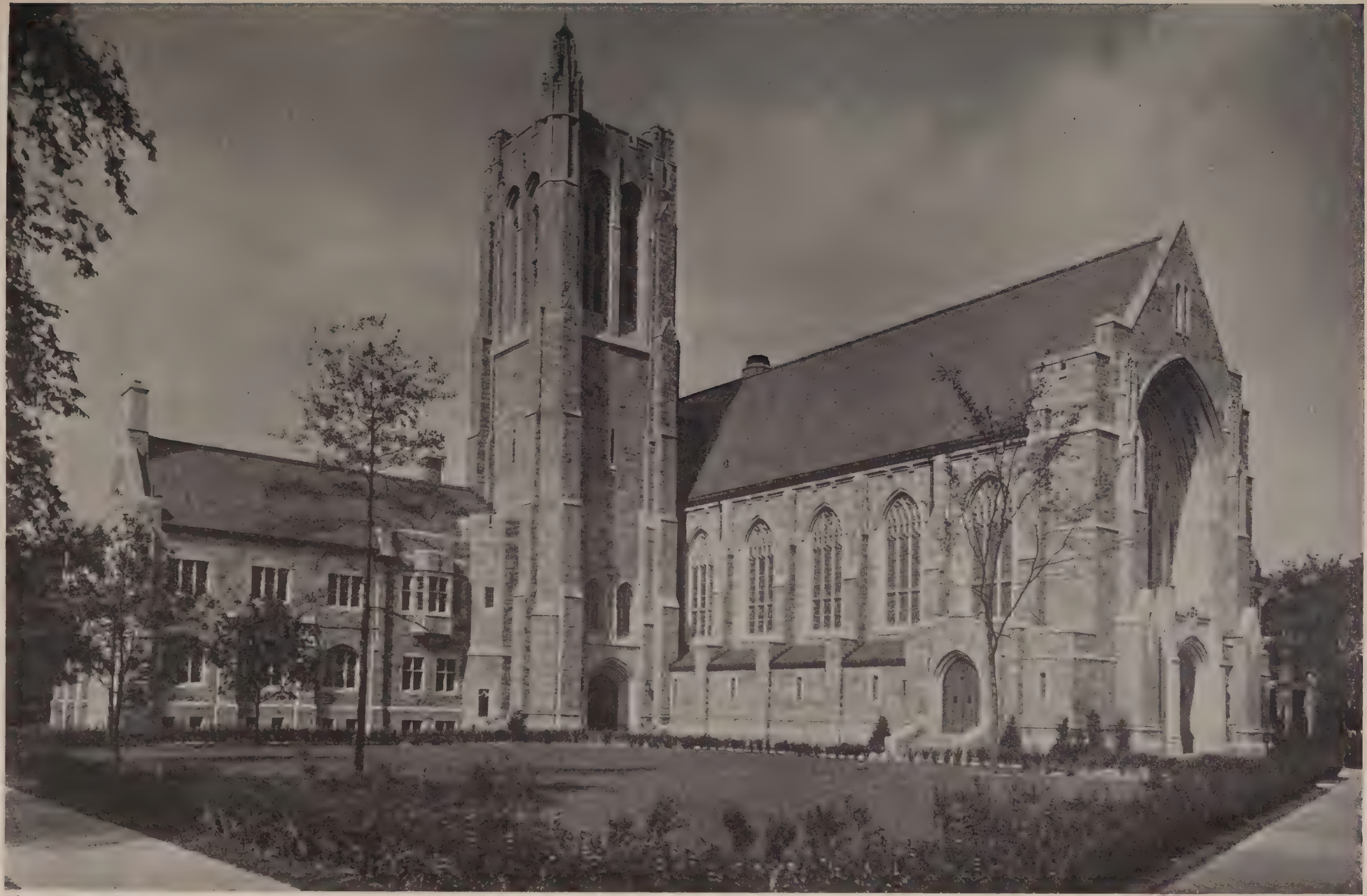
PLAN

NATIONAL PRESBYTERIAN CHURCH, WASHINGTON

CRAM & FERGUSON, ARCHITECTS



FIRST PRESBYTERIAN CHURCH, CHICAGO
TALLMADGE & WATSON, ARCHITECTS



Photos. Thomas Ellison

Plans on Back

JEFFERSON AVENUE PRESBYTERIAN CHURCH, DETROIT
SMITH, HINCHMAN & GRYLLS, ARCHITECTS

COST AND CONSTRUCTION DATA

Date of Completion: April 1, 1926.

Type of Construction: Masonry walls, concrete floors, steel and wood roof construction.

Exterior Walls: Limestone, stucco and half timber.

Roof: Slate and lead.

Floors: Cement, terrazzo, tile and slate, cork tile and wood.

Windows: Steel casements.

Interior Materials: Plaster, marble, wood and tile.

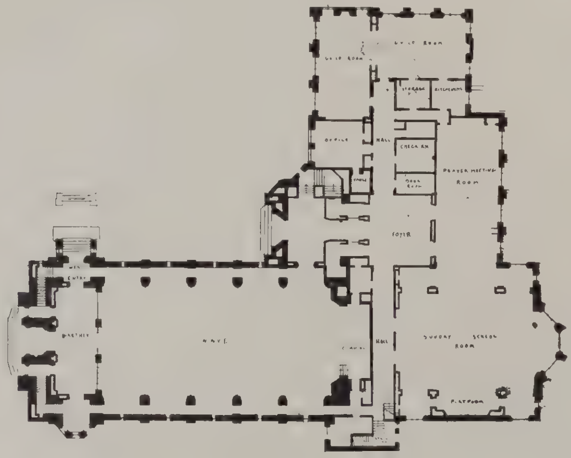
Heating: Direct radiation and blast cast iron boilers.

Electrical Equipment: Lighting and chime control.

Cubage of Building: 1,182,400 feet.

Cubic Foot Cost: 61 cents.

Total Cost of Building: $727,344.17.



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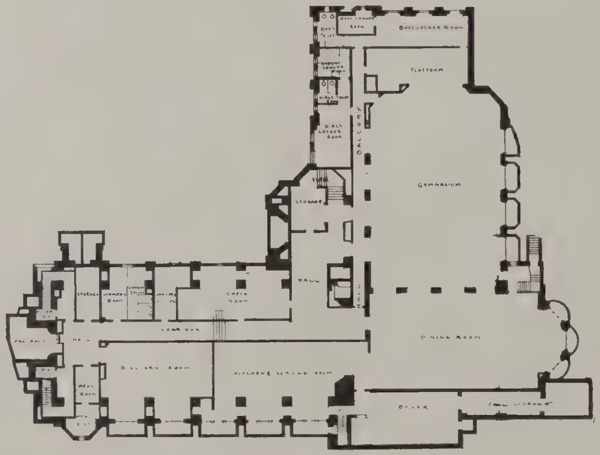
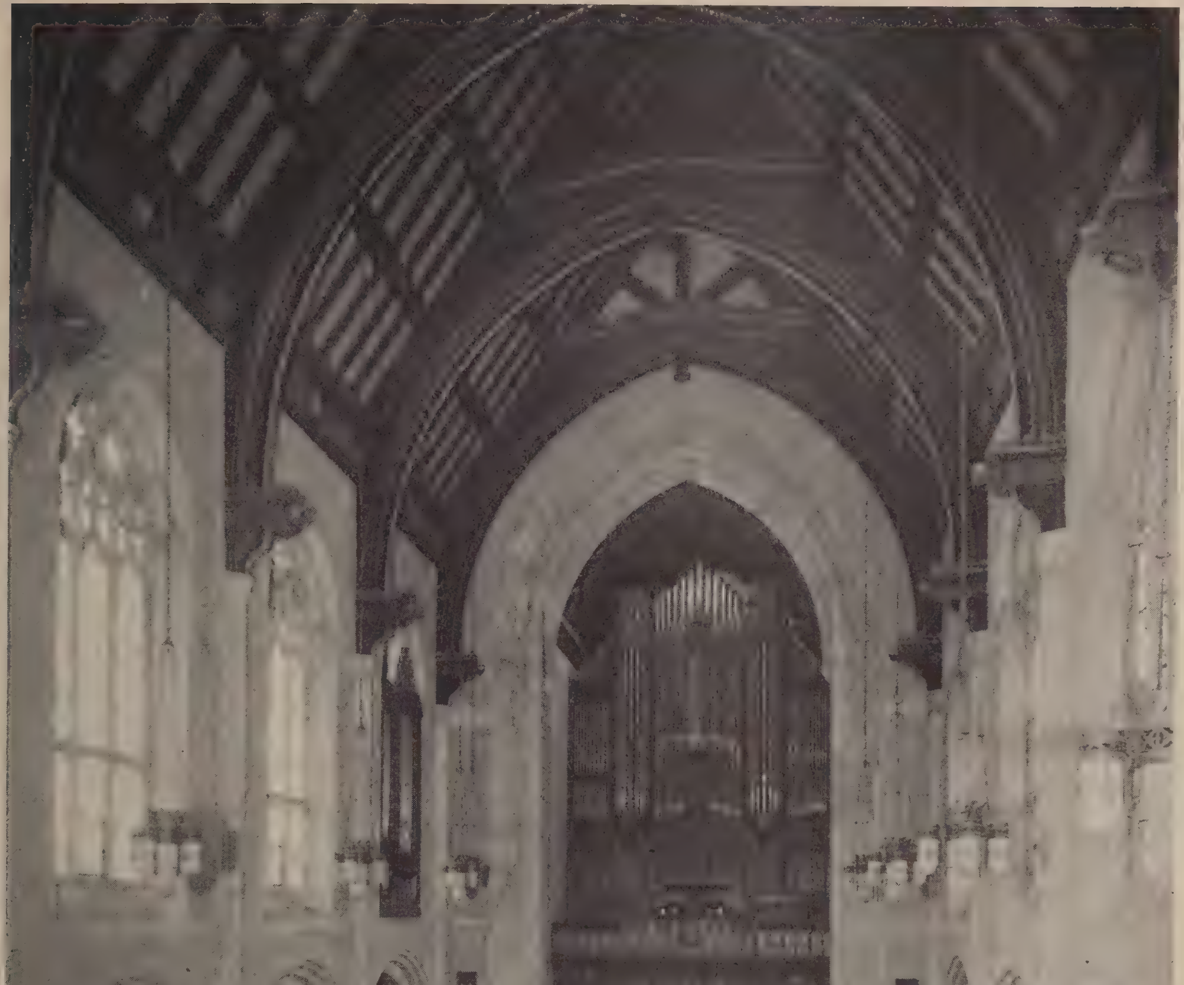
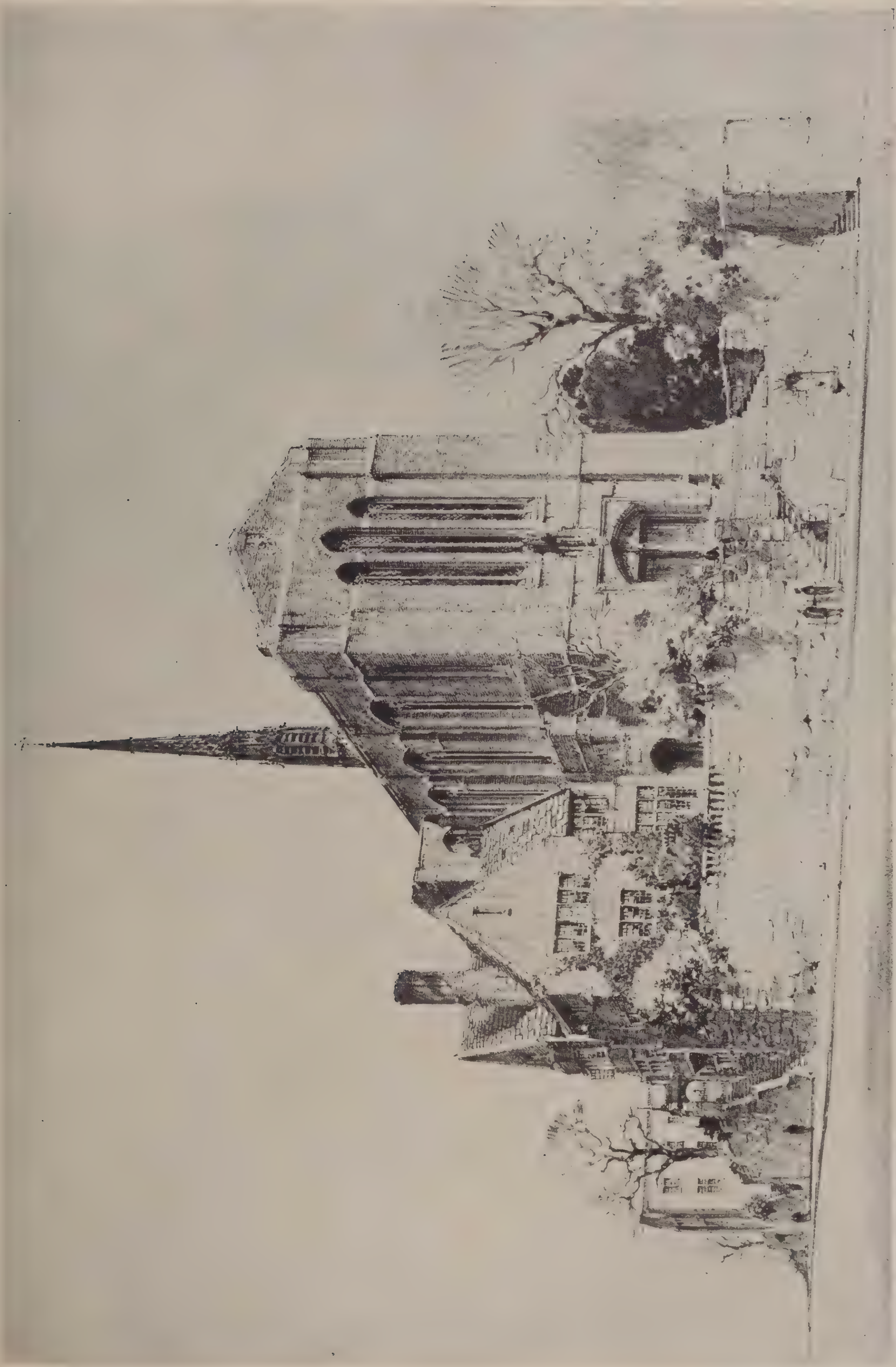


BASEMENT

PLANS: JEFFERSON AVENUE PRESBYTERIAN CHURCH, DETROIT
SMITH, HINCHMAN & GRYLLS, ARCHITECTS

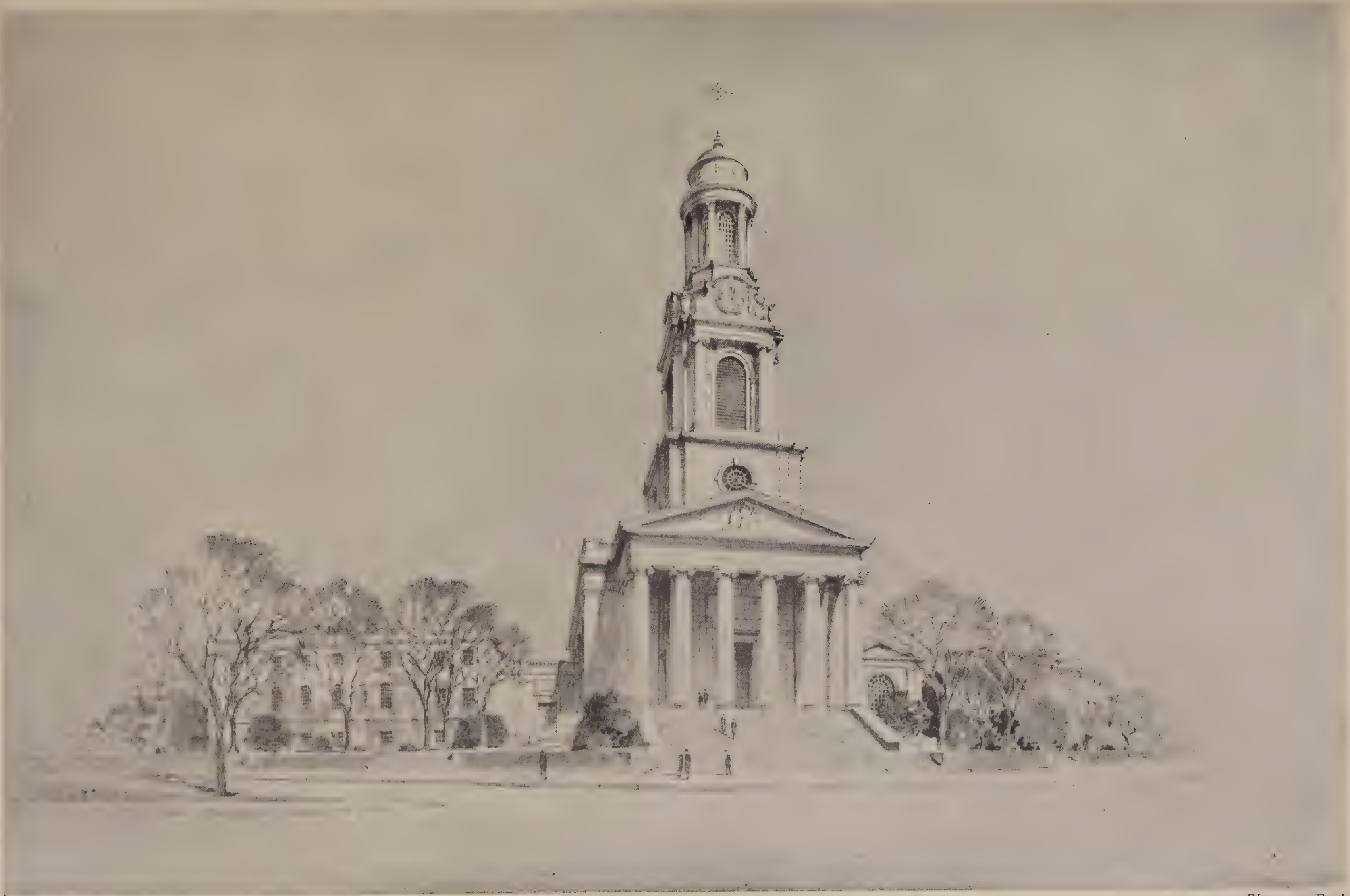


JEFFERSON AVENUE PRESBYTERIAN CHURCH, DETROIT
SMITH, HINCHMAN & GRYLLS, ARCHITECTS



From a Rendering by Otto R. Eggers

STUDY FOR HOLY TRINITY CHURCH, NEW YORK
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



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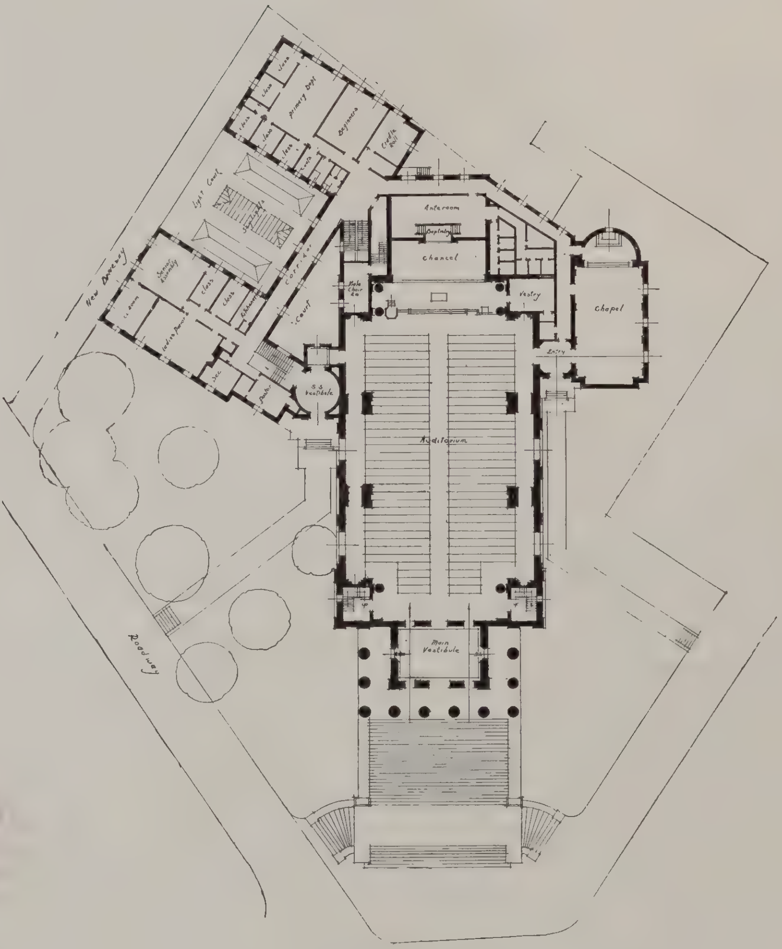
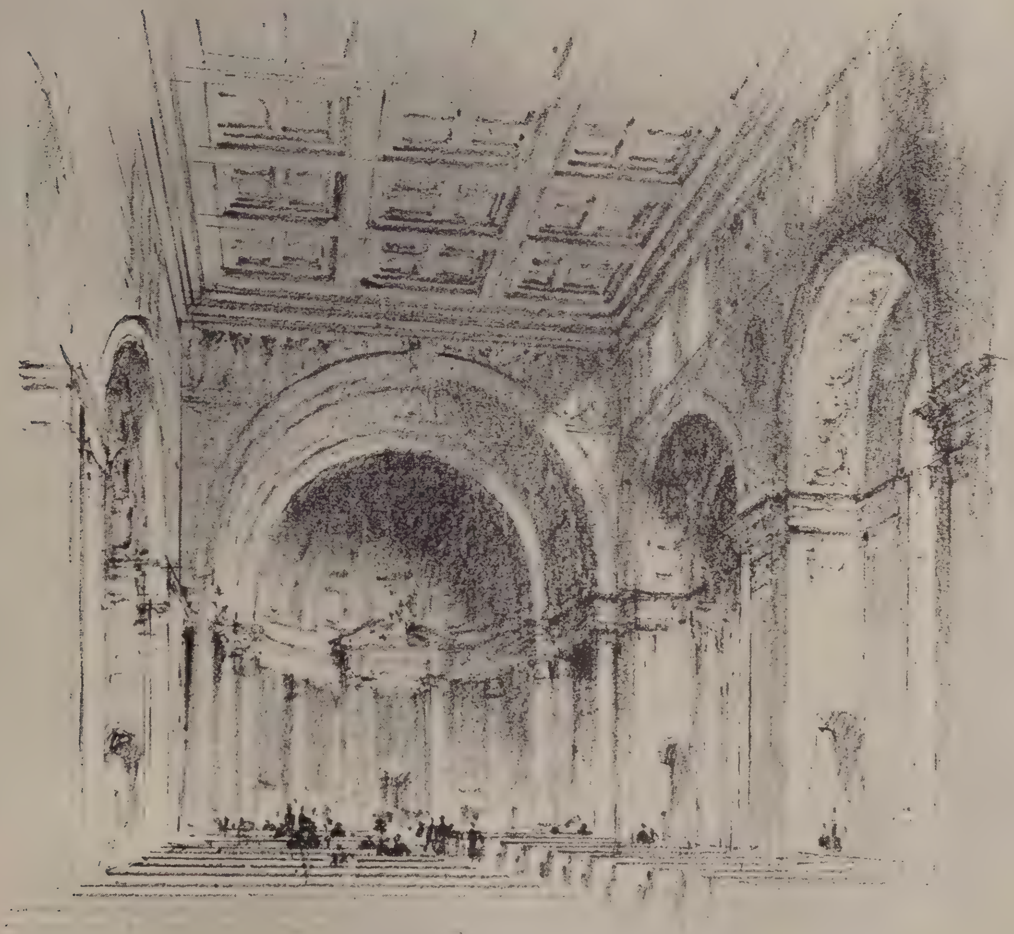
Plans on Back

NATIONAL CITY CHRISTIAN CHURCH, WASHINGTON
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



FIRST FLOOR

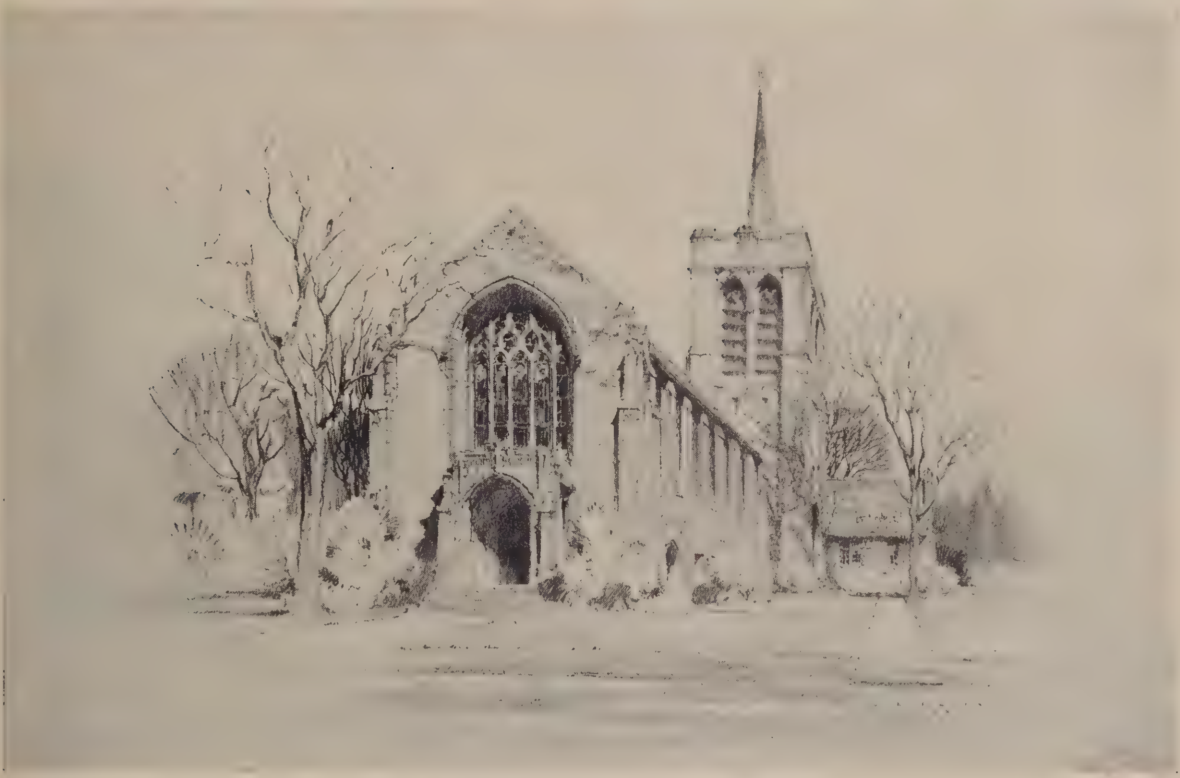
PLAN: NATIONAL CITY CHRISTIAN CHURCH, WASHINGTON
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



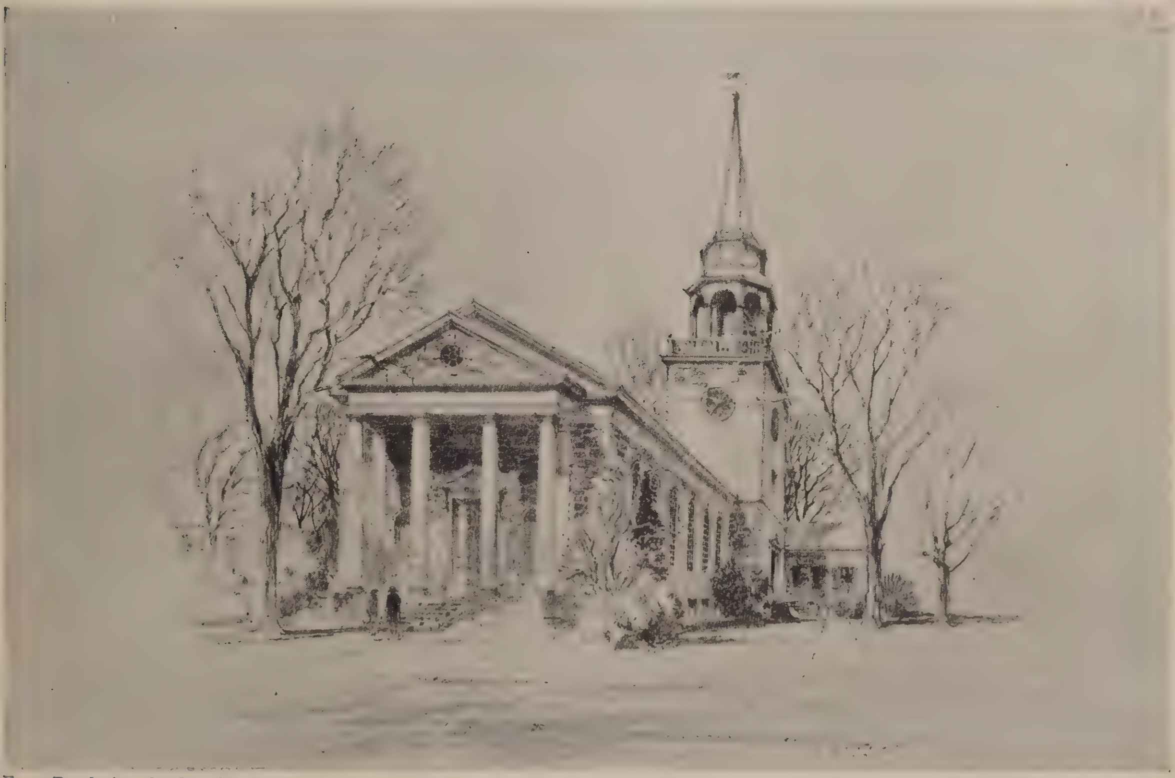
From a Rendering by Otto R. Eggers

INTERIOR NATIONAL CITY CHRISTIAN CHURCH, WASHINGTON

OFFICE OF JOHN RUSSELL POPE, ARCHITECT



IN THE ENGLISH GOTHIC MANNER



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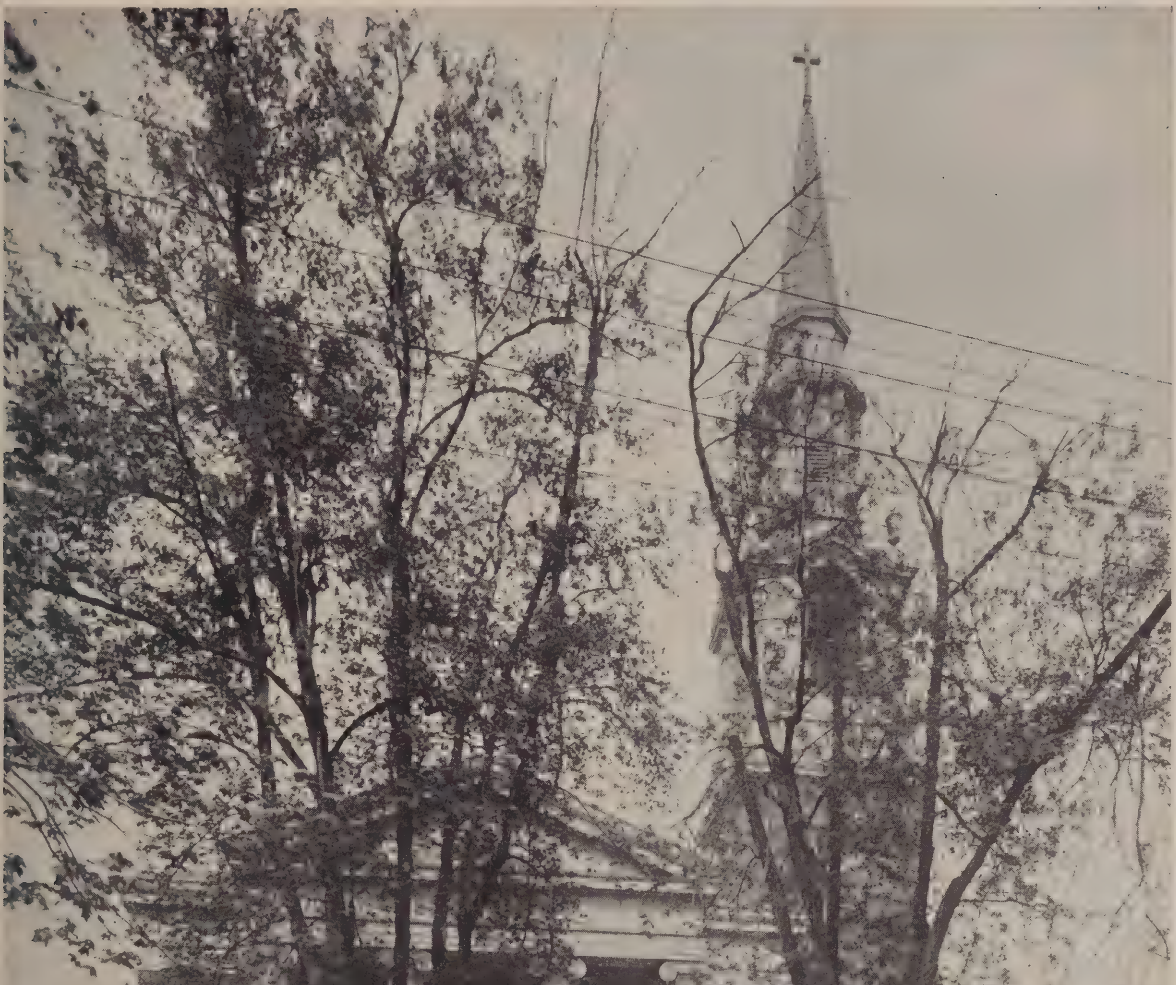
IN THE COLONIAL MANNER

TWO DESIGNS FOR COUNTRY CHURCHES

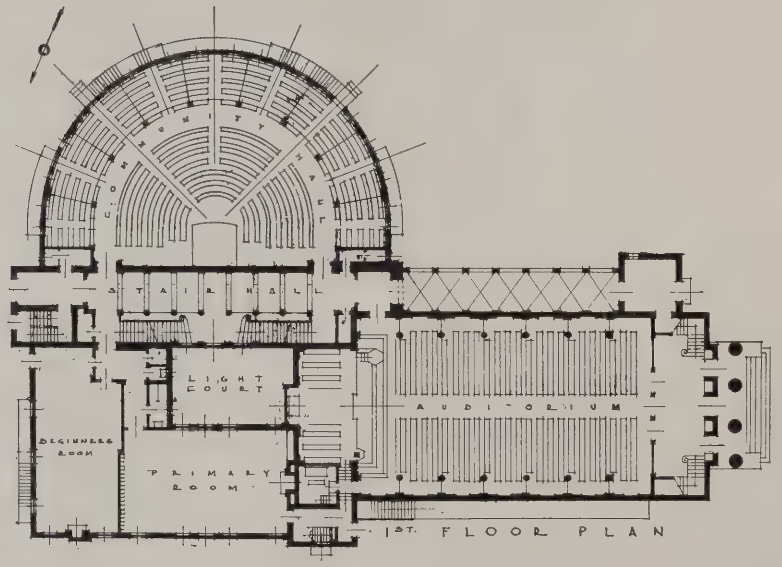
OFFICE OF JOHN RUSSELL POPE, ARCHITECT



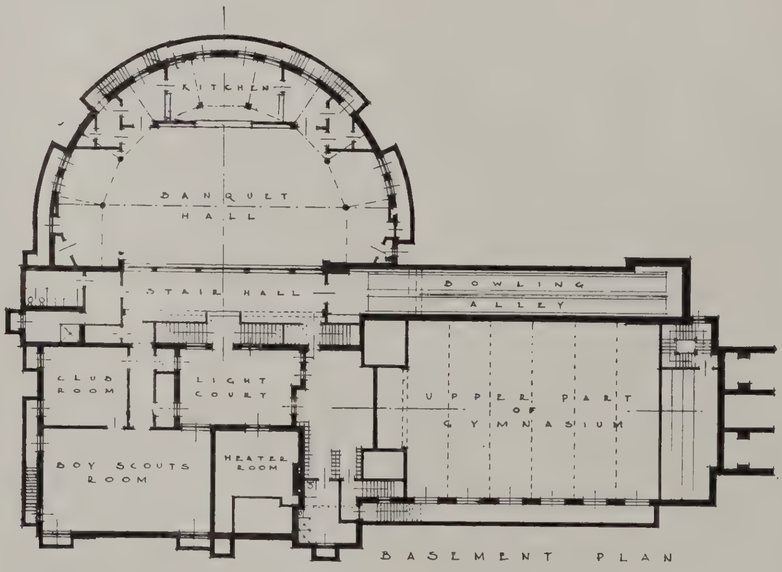
Photos. Drix Duryea

Plans on Back

JAMAICA METHODIST EPISCOPAL CHURCH, JAMAICA, N. Y.
JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE ARCHITECT

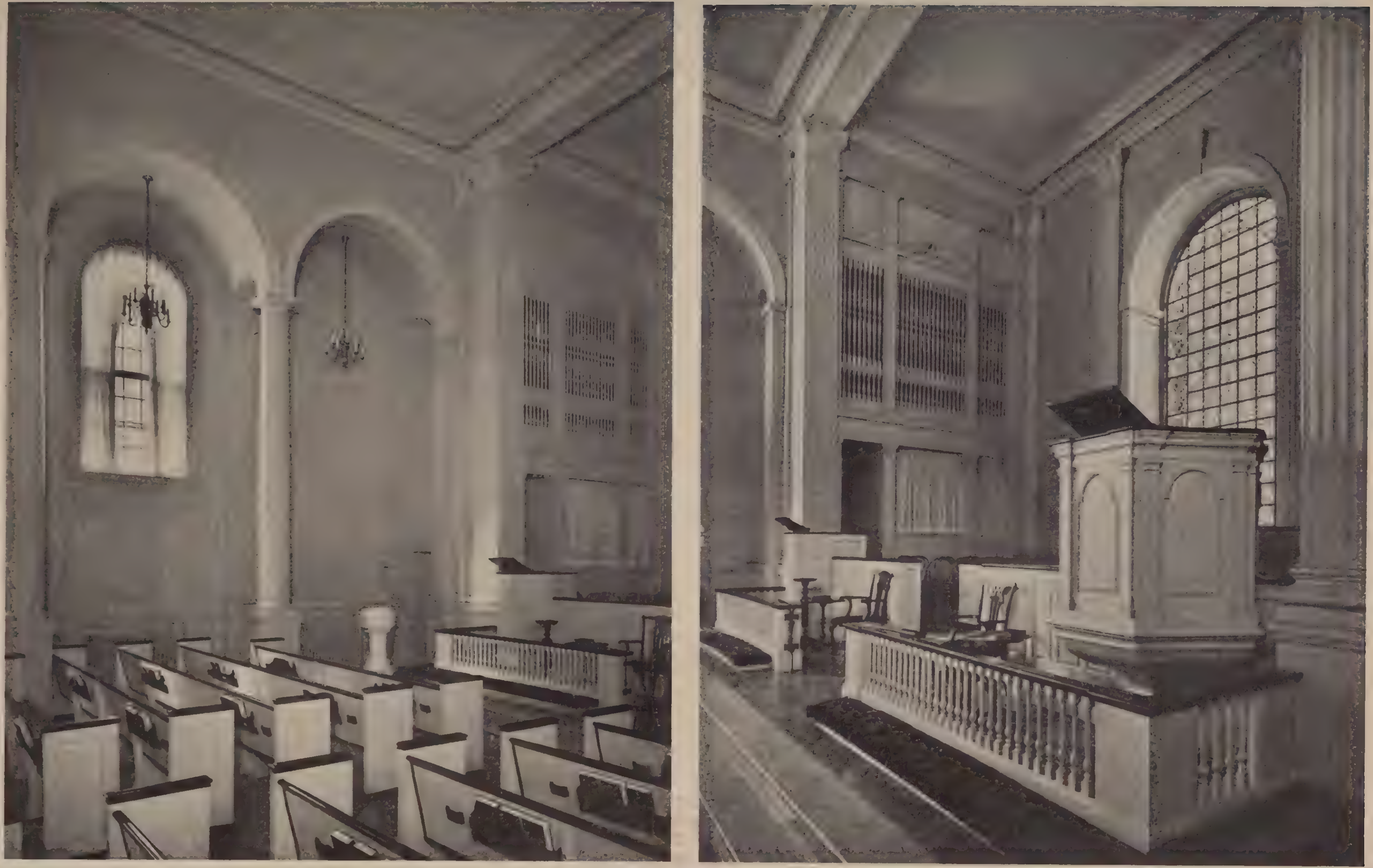


1ST. FLOOR PLAN



BASEMENT PLAN

PLANS: JAMAICA METHODIST EPISCOPAL CHURCH, JAMAICA, N. Y.
JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE ARCHITECT

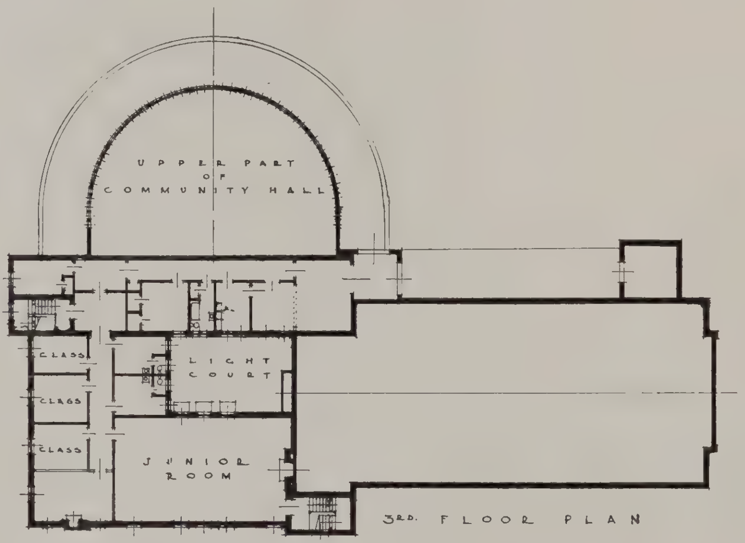


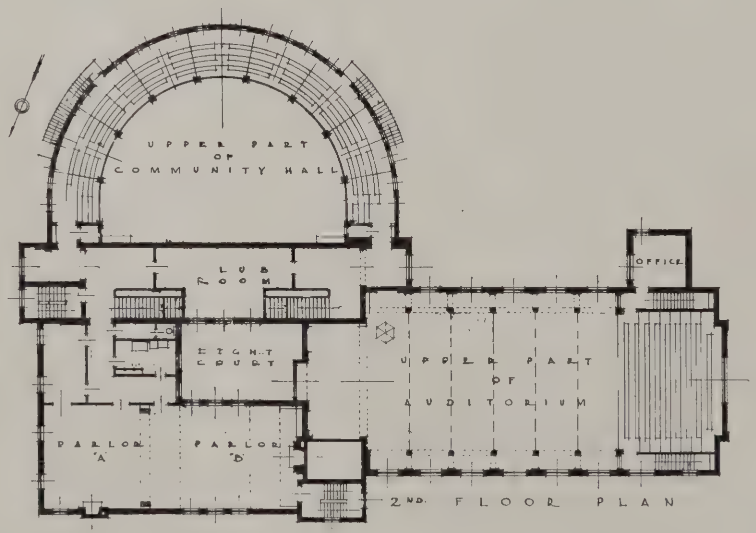
Plans on Back

JAMAICA METHODIST EPISCOPAL CHURCH, JAMAICA, N. Y.
JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE ARCHITECT

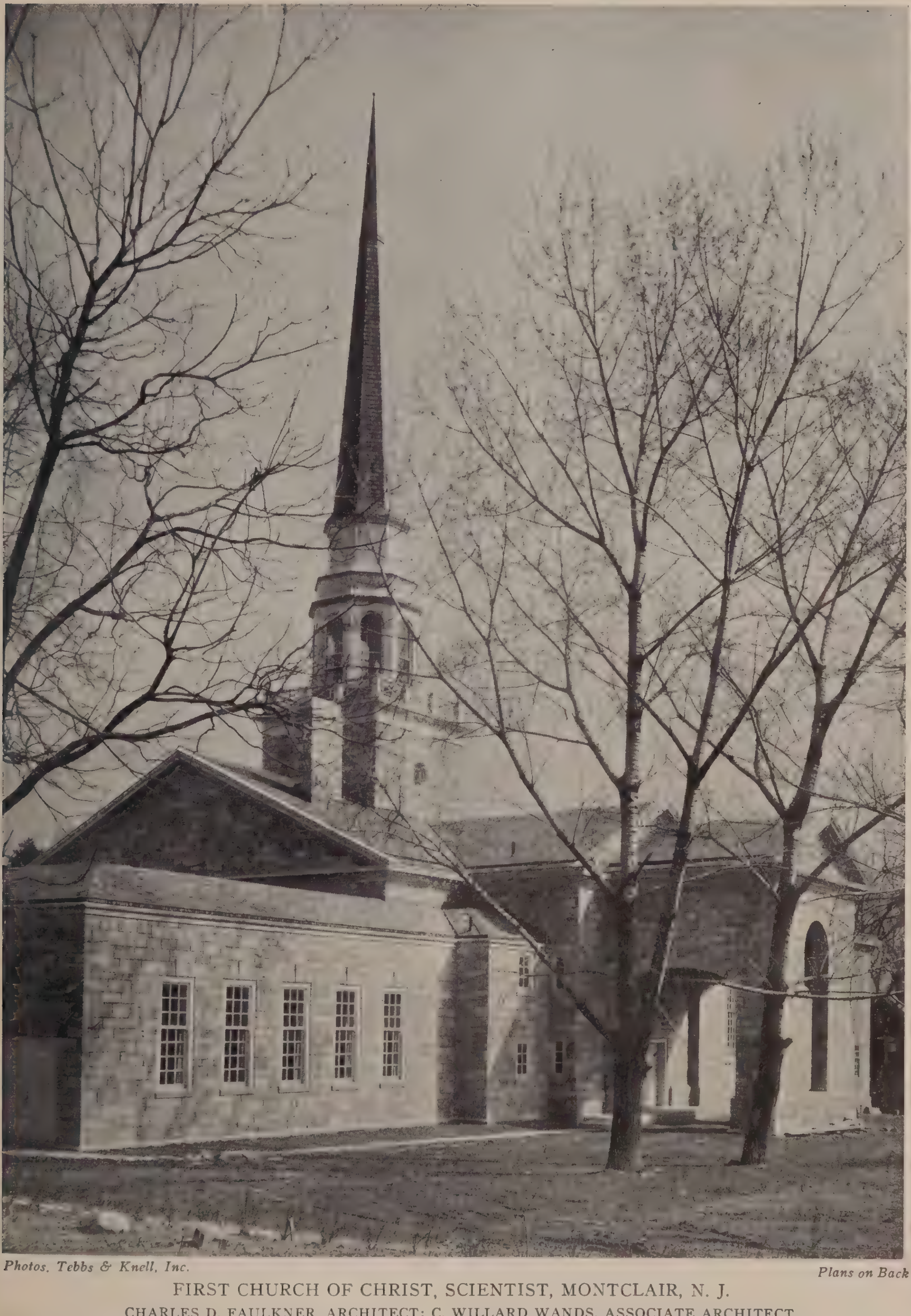
COST AND CONSTRUCTION DATA

Year of Completion: 1925.
Type of Construction: Brick and wood frame; steel columns and girders.
Exterior Walls: Brick, limestone, granite.
Roof: Zinc.
Floors: Oak and composition.
Windows: Wood.
Interior Materials: Wood and granite.
Heating: Vapor.
Electrical Equipment: Rigid conduit.
Cubic Foot Cost: 37½ cents.
Total Cost of Building: $300,000.





PLANS: JAMAICA METHODIST EPISCOPAL CHURCH, JAMAICA, N. Y.
JOSEPH HUDNUT, ARCHITECT; W. E. MANHART, ASSOCIATE ARCHITECT



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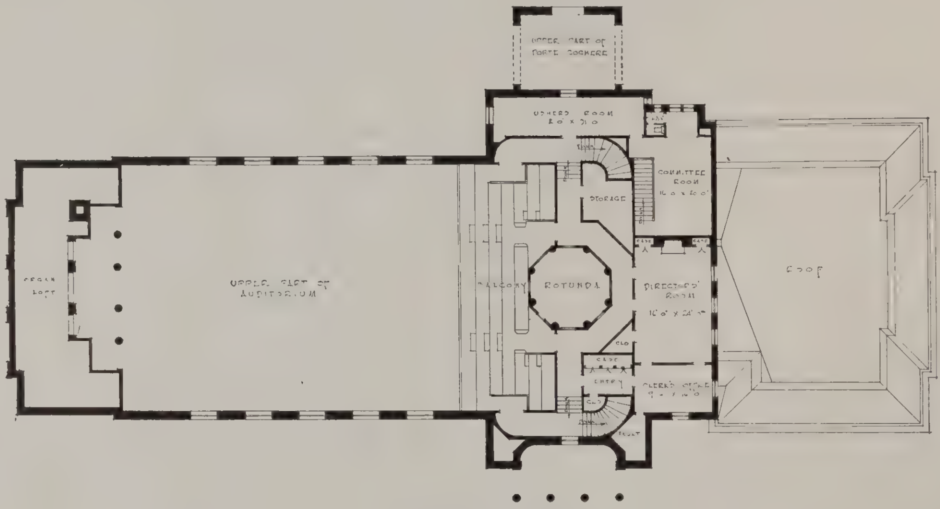
Plans on Back

FIRST CHURCH OF CHRIST, SCIENTIST, MONTCLAIR, N. J.
CHARLES D. FAULKNER, ARCHITECT; C. WILLARD WANDS, ASSOCIATE ARCHITECT



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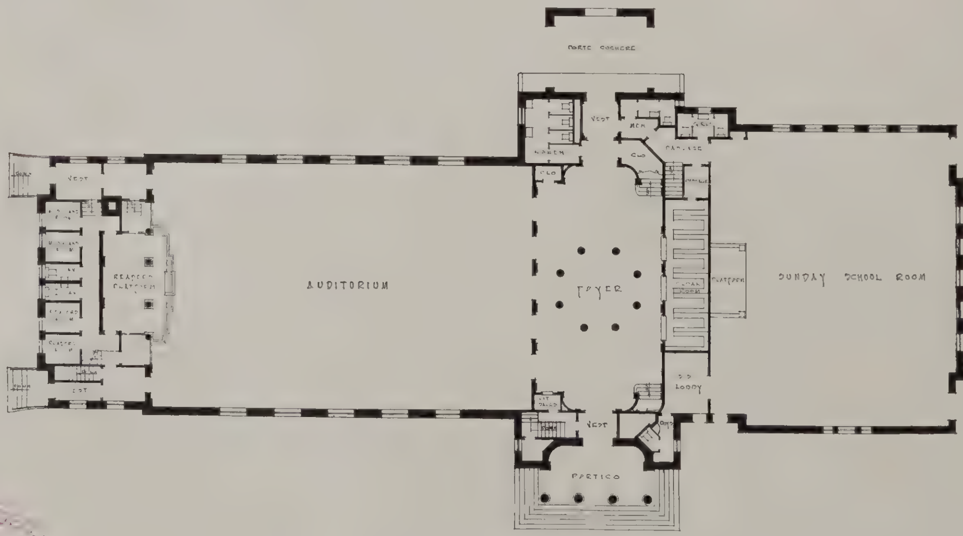

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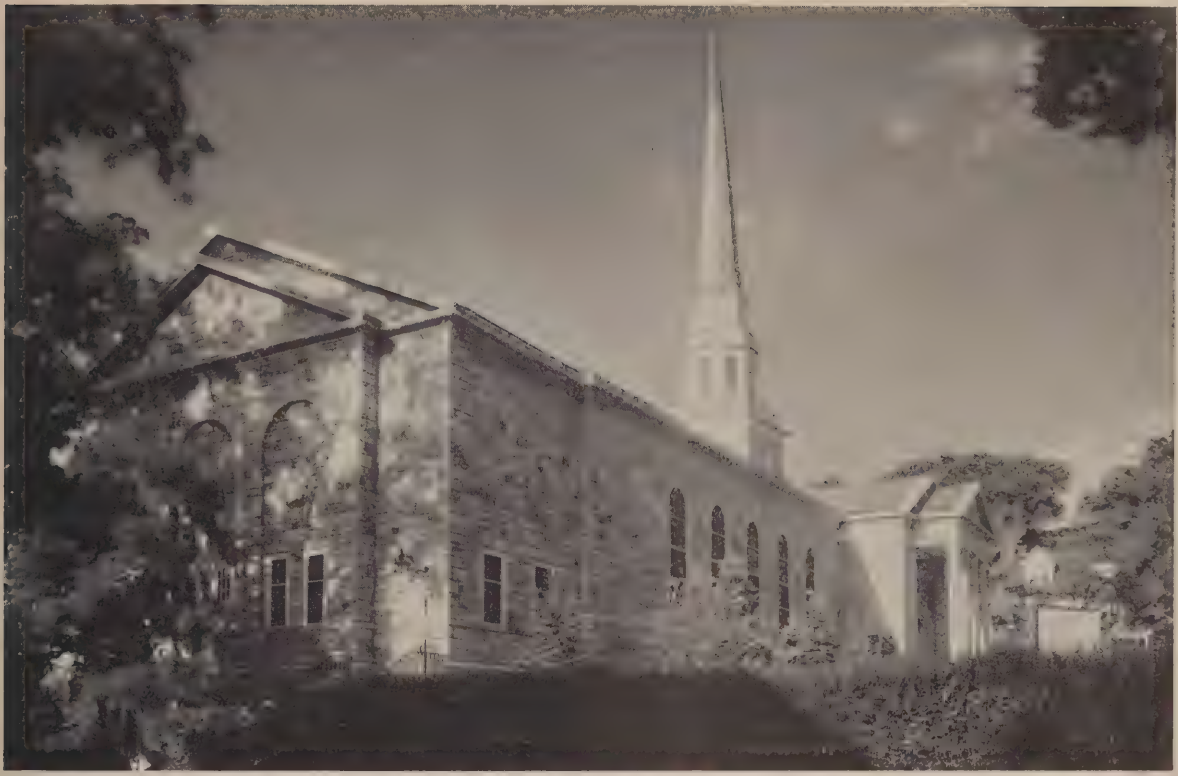

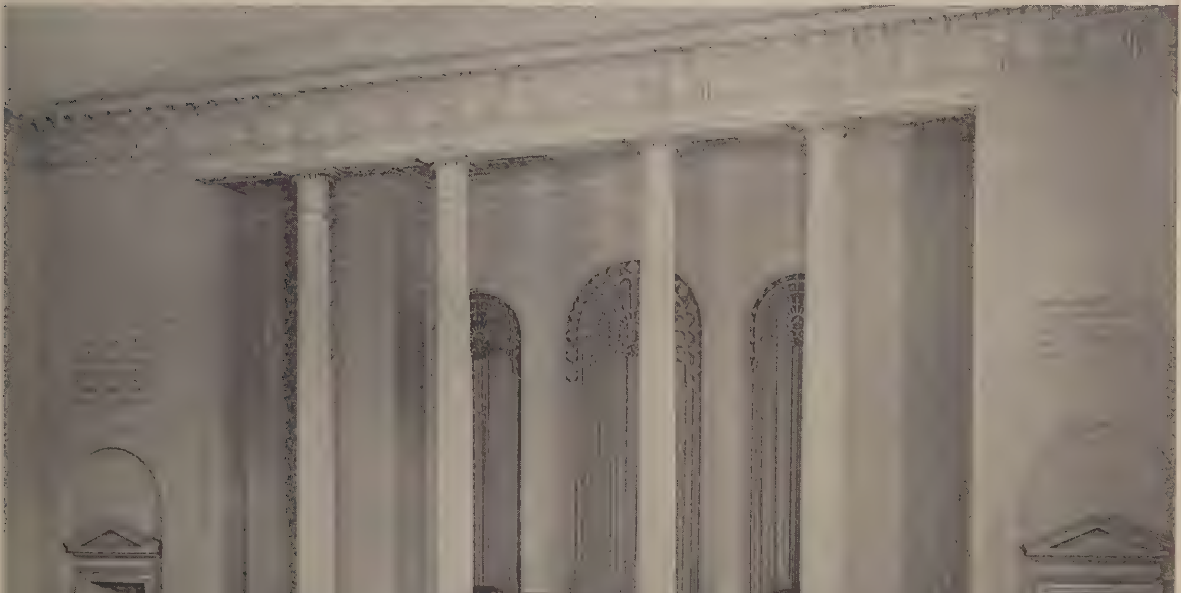

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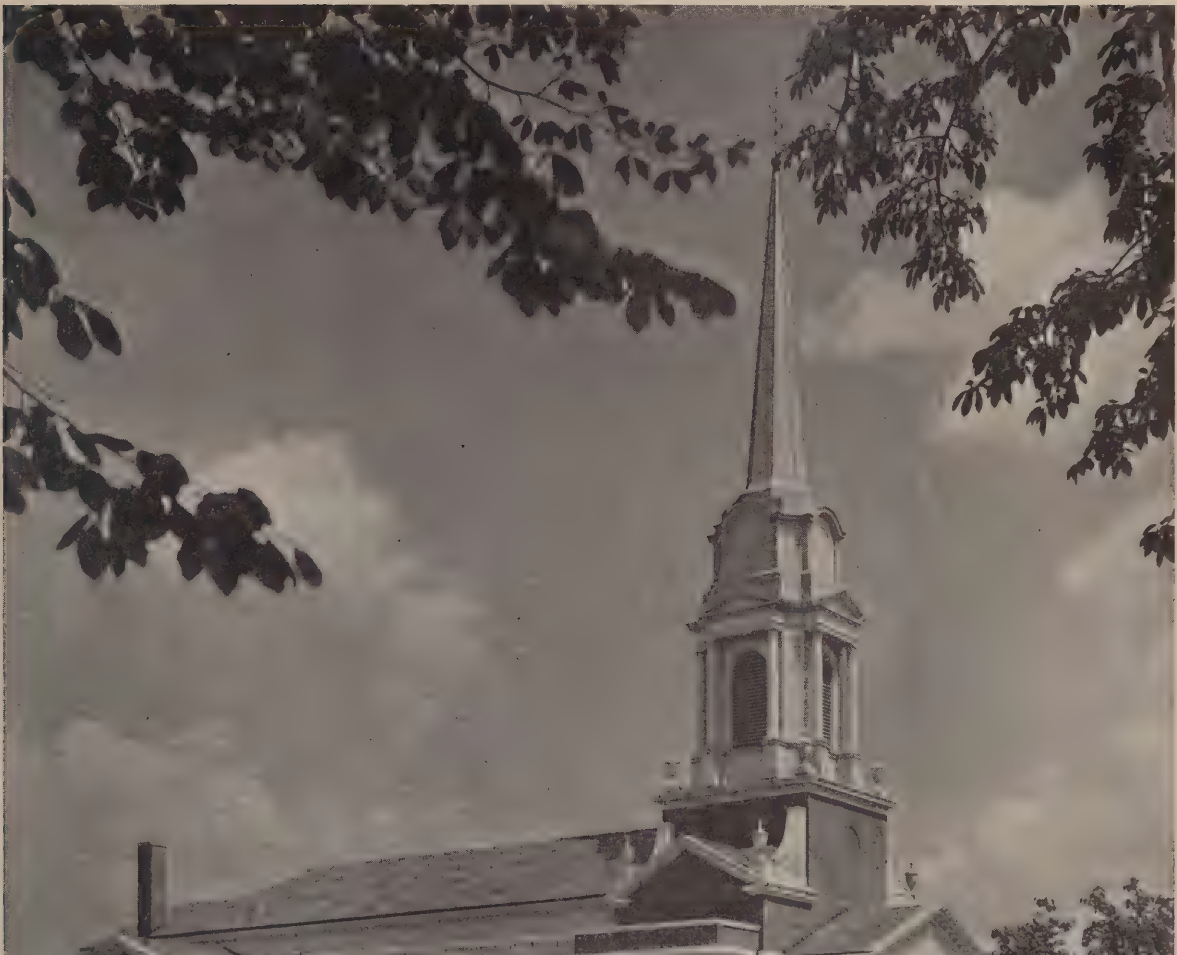
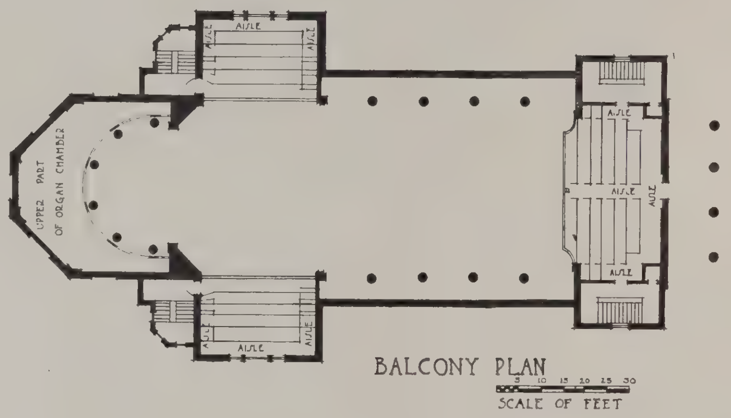


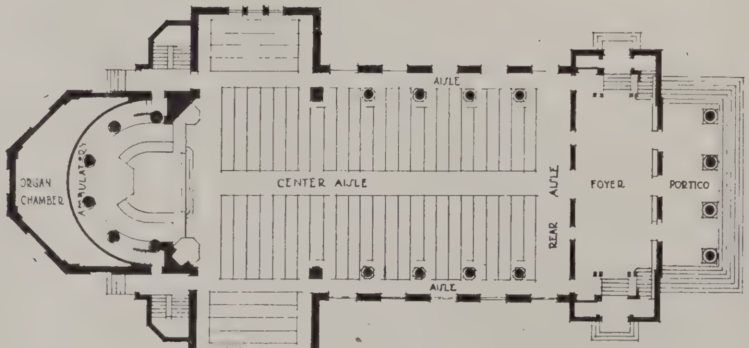
Photos. S. H. Gottscho *Plans on Back*

VOORHEES CHAPEL, NEW JERSEY COLLEGE FOR WOMEN, NEW BRUNSWICK, N. J.

LUDLOW & PEABODY, ARCHITECTS



BALCONY PLAN



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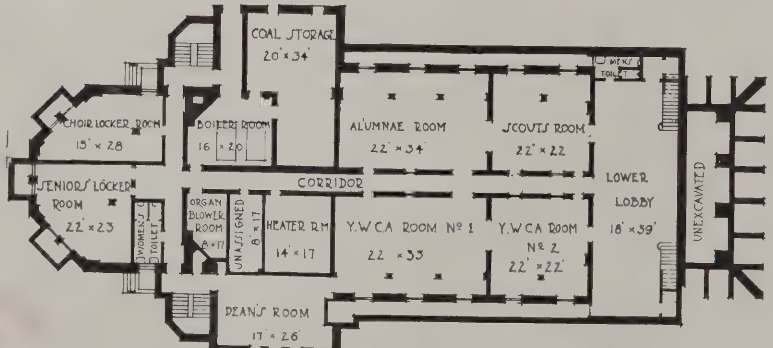
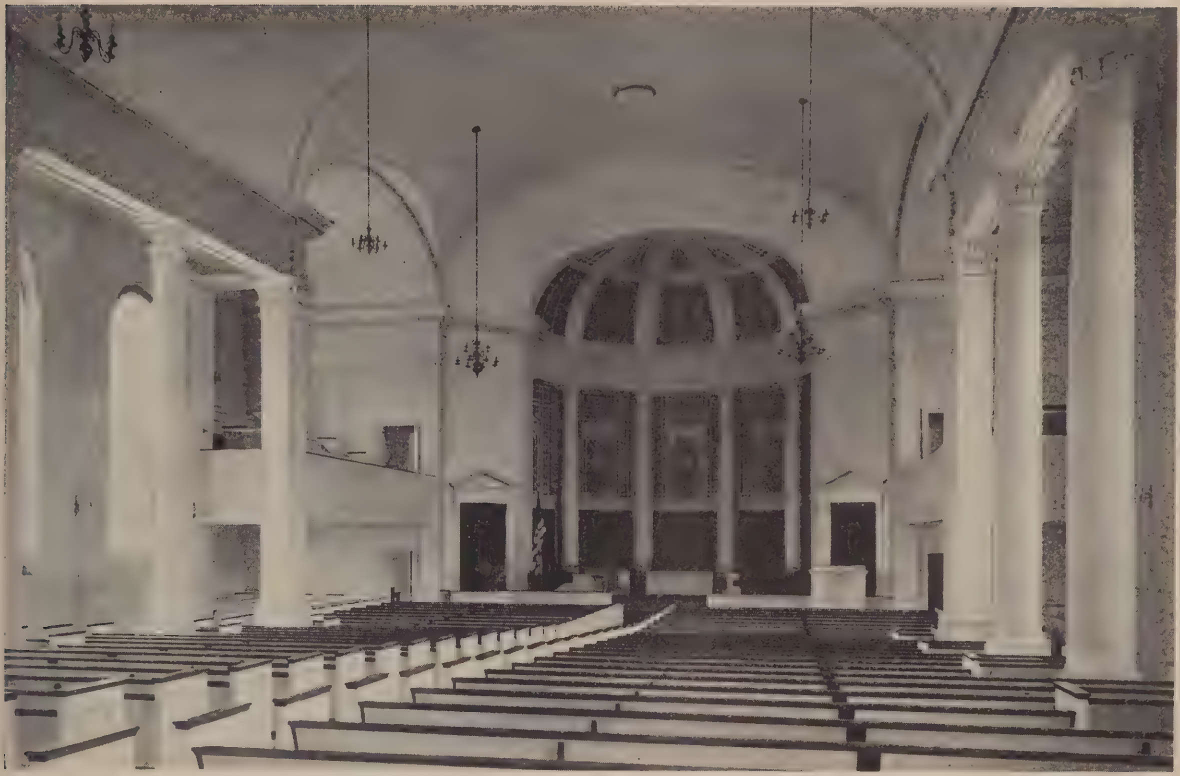
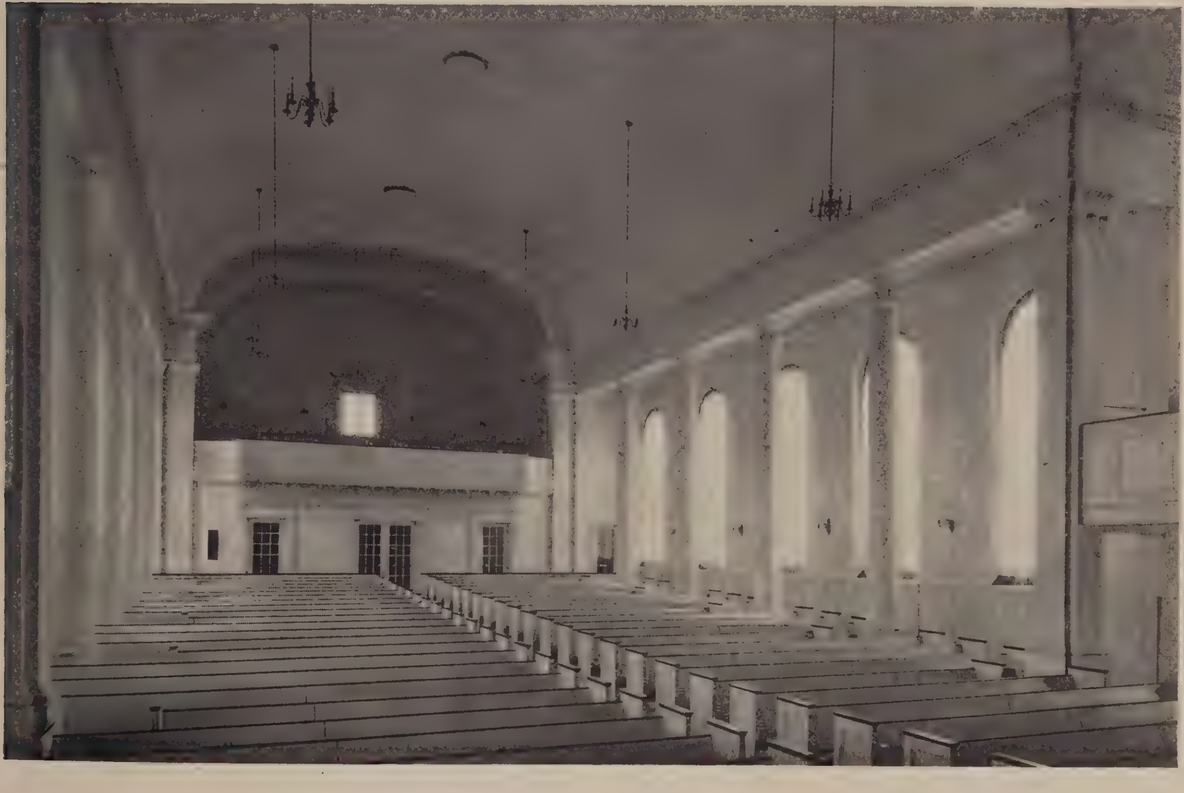


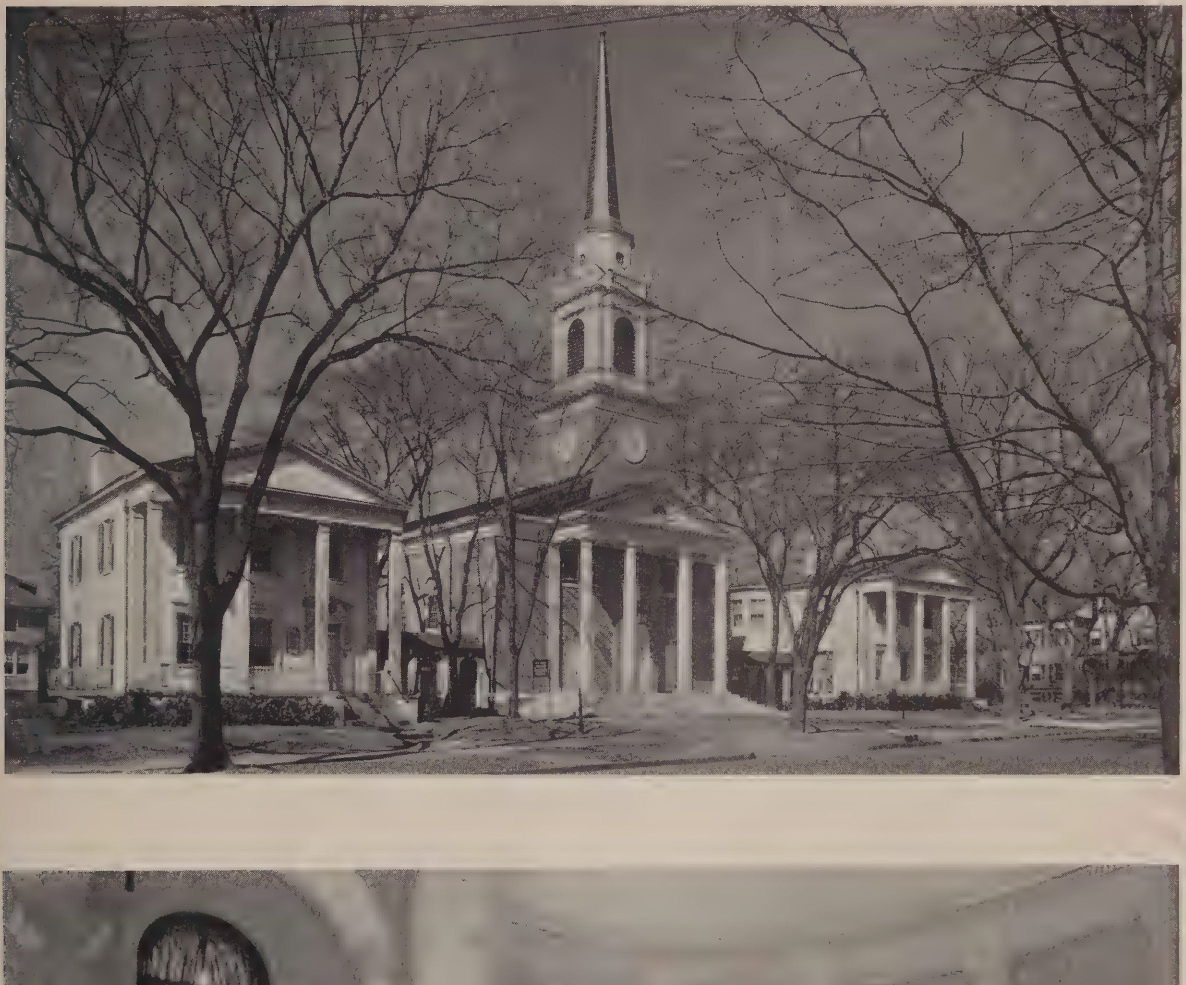
PLAN OF BASEMENT FLOOR

PLANS: VOORHEES CHAPEL, NEW JERSEY COLLEGE FOR WOMEN
NEW BRUNSWICK, N. J.
LUDLOW & PEABODY, ARCHITECTS





VOORHEES CHAPEL. NEW JERSEY COLLEGE FOR WOMEN, NEW BRUNSWICK, N. J.
LUDLOW & PEABODY, ARCHITECTS



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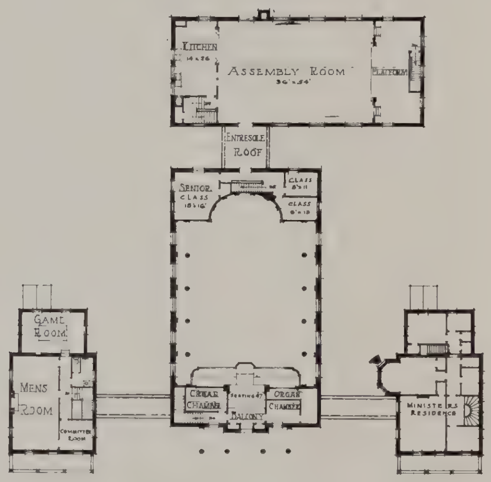
Plans on Back

SECOND DUTCH REFORMED CHURCH, NEW BRUNSWICK, N. J.
LUDLOW & PEABODY, ARCHITECTS



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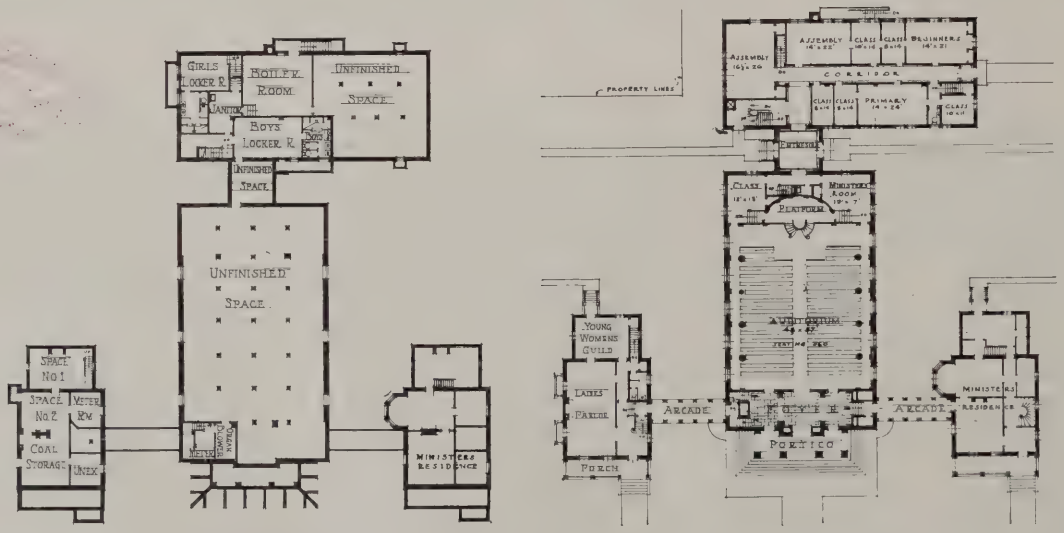
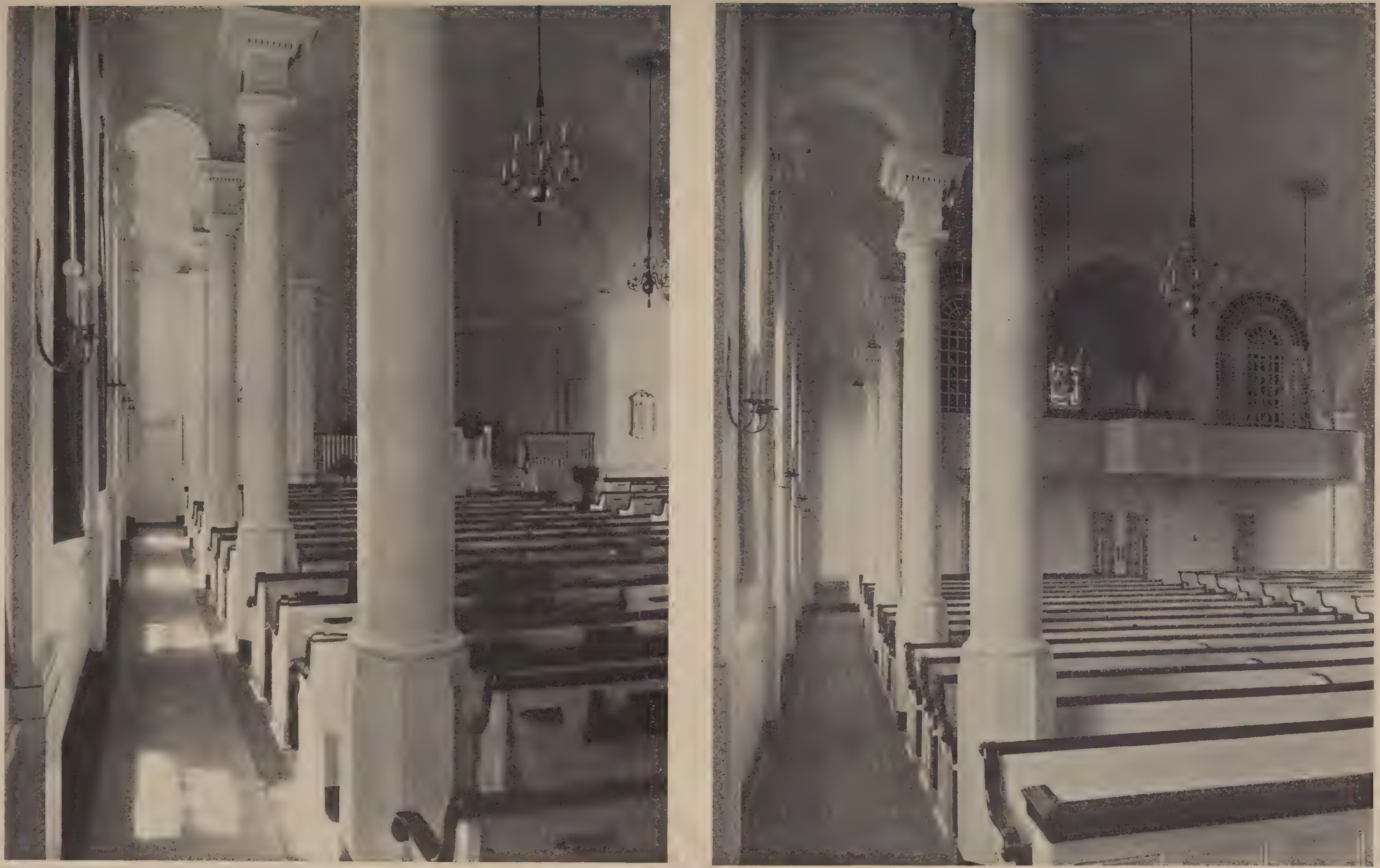


BASEMENT FIRST FLOOR

PLANS: SECOND DUTCH REFORMED CHURCH, NEW BRUNSWICK, N. J.
LUDLOW & PEABODY, ARCHITECTS



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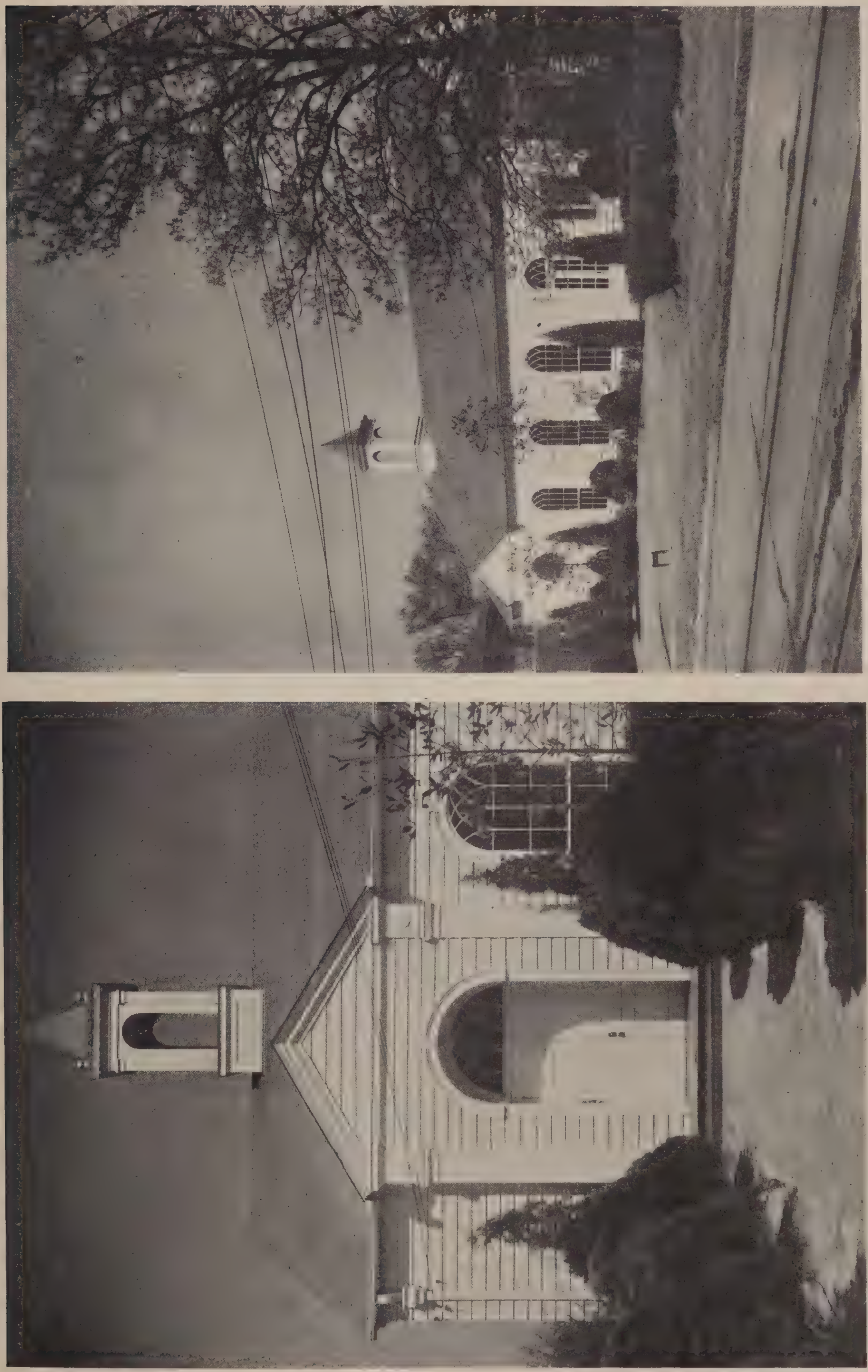
LUDLOW & PEABODY, ARCHITECTS



Photos. Tebbs & Knell, Inc.

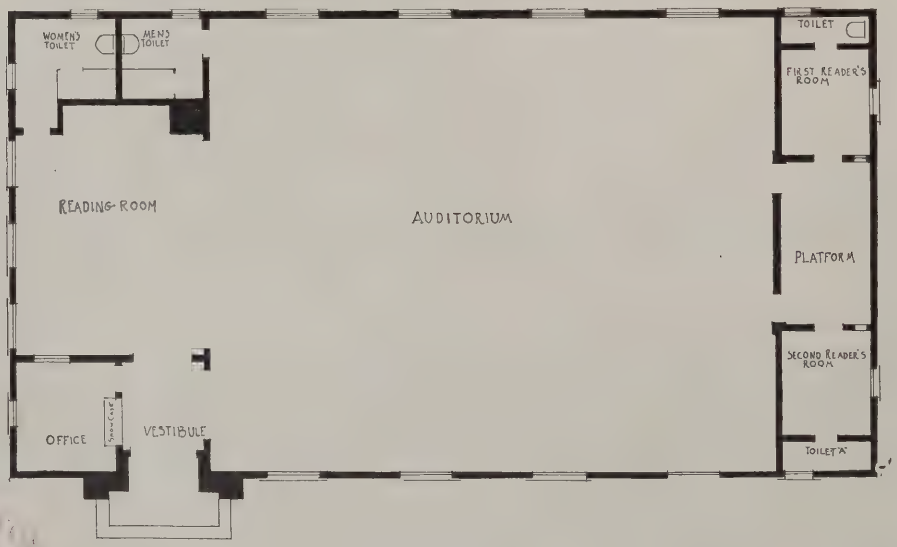
Plan on Back

SECOND CHURCH OF CHRIST, SCIENTIST, ATLANTA
PRINGLE & SMITH, ARCHITECTS

COST AND CONSTRUCTION DATA

Date of Completion: March, 1928.
Type of Construction: Frame.
Exterior Walls: Wide siding.
Roof: Composition shingles.
Floors: Oak.
Windows: Wood.

Interior Materials: Plaster.
Heating: Warm air furnace.
Cubage of Building: 61,800 feet.
Cubic Foot Cost: 12 cents.
Total Cost of Building: $7,500.



FIRST FLOOR

PLAN: SECOND CHURCH OF CHRIST, SCIENTIST, ATLANTA
PRINGLE & SMITH, ARCHITECTS

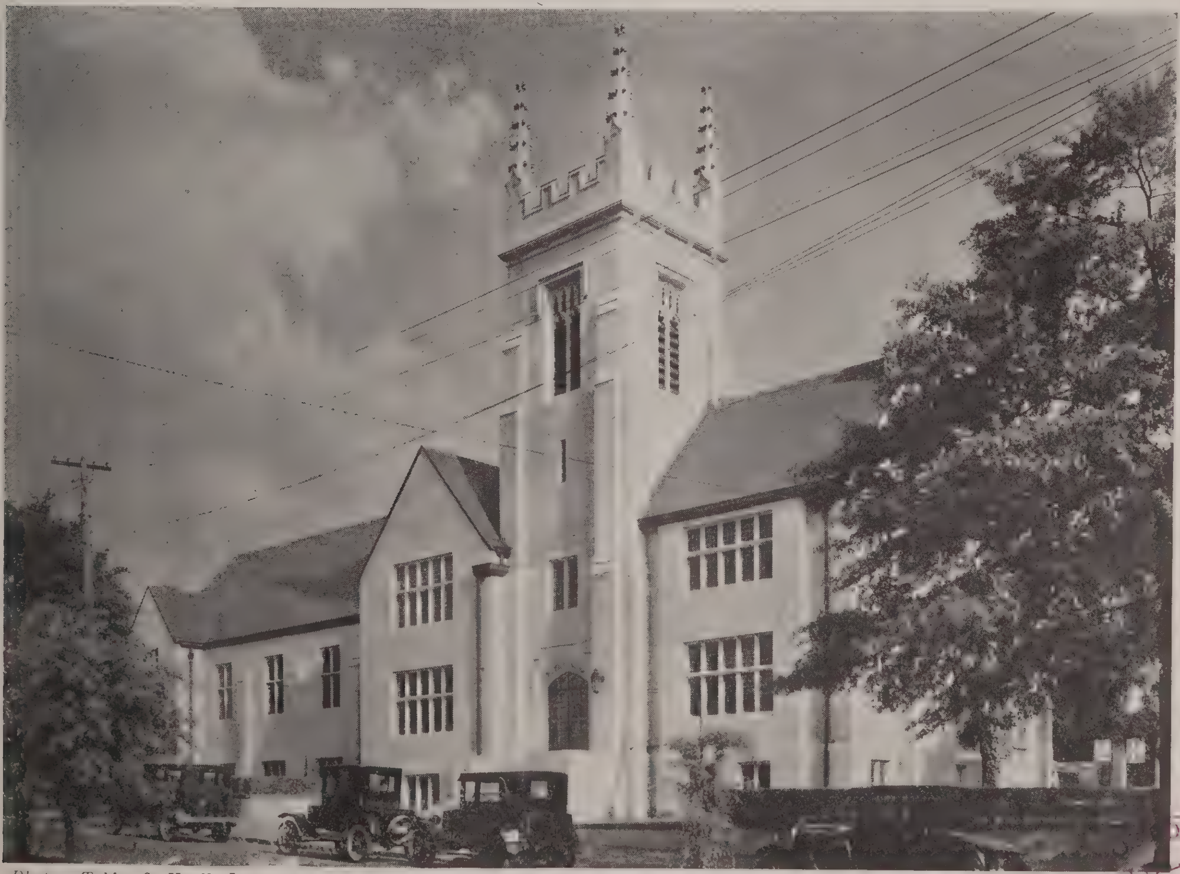
IS GOTHIC A DEAD STYLE?

BY

HOBART B. UPJOHN

I SOMETIMES wonder whether it is due to the youth of our country or whether it is because of a phase of human nature, but certainly it is true that we are a country and a people swayed by fads. The populace is very likely to do this or that thing, not because people personally are convinced that it is the proper or right thing to do, but because they must endeavor to please or perhaps play up to an imaginary public demand or taste. It is pitiable to find that this condition obtains pretty generally throughout the country. Take the newspapers. If someone commits a dastardly murder, the entire front pages of all the newspapers are dominated with flashing headlines relating to it, and if one asks those responsible they will say that the "public demands it." If you do a remarkable painting you will be fortunate to find it on the fifth page, but if you can manage to insult your building committee and destroy your models and designs, you can look forward to a prominent place on the first page for weeks! So, in a sense, it applies to architecture and to art in general. It is almost disgusting where it is seen in advertising. Someone will have a bright idea, such as the introduction of a magnifying glass on a certain portion of an object to be advertised, whereby a detail can be shown at a larger scale. I mention this particular instance because I remember distinctly watching a number of little "me too's" that followed such an original idea. If one devises a clever name for a product, immediately everyone must have a new name. It is not a matter of self interpretations or individual solution of a problem.

Many of us architects are sluggish or lazy, and instead of trying to attack the problem as it is, we rush to a file containing the works of Brown, Jones & Smith, and draw out cuts of an existing building, because perhaps the building has received the acclaim of the profession as a whole, and make an emasculated copy of it. Perhaps there is nothing so fleeting and momentary as the prestige of an architect or the vogue of his particularly interpreted style. Years roll by and an-



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St. James' Community House, Wilmington, N. C.

Hobart B. Upjohn, Architect

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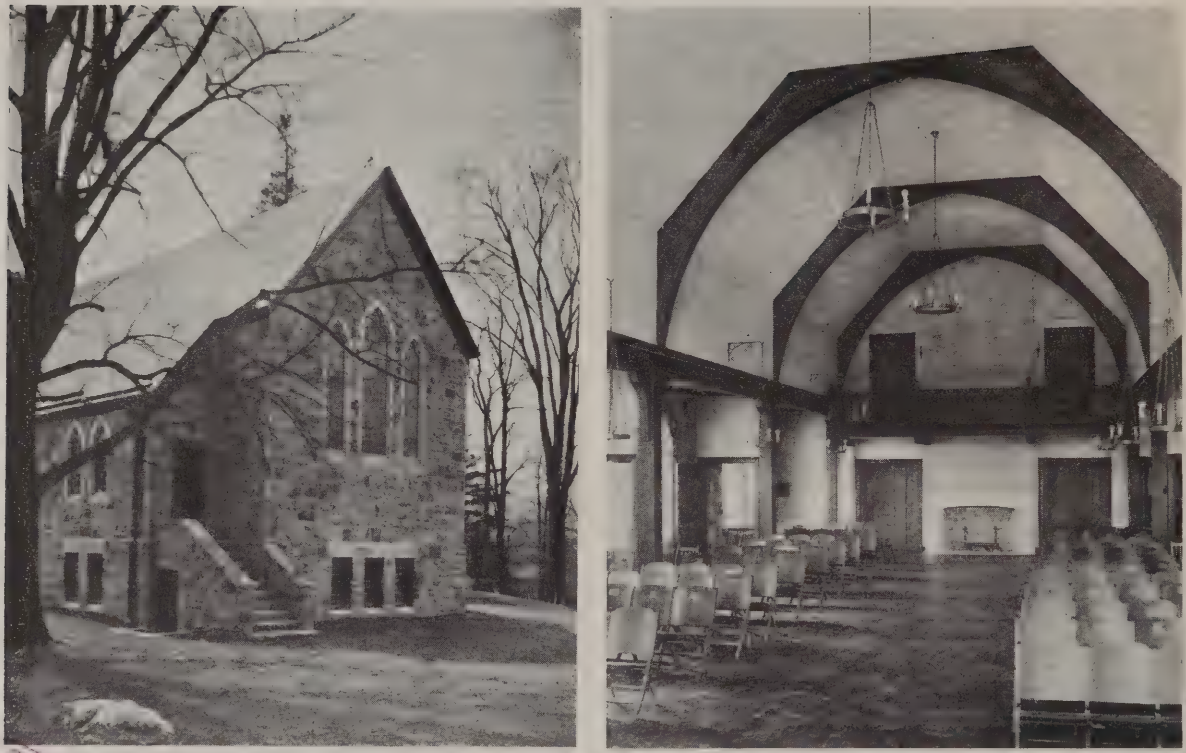
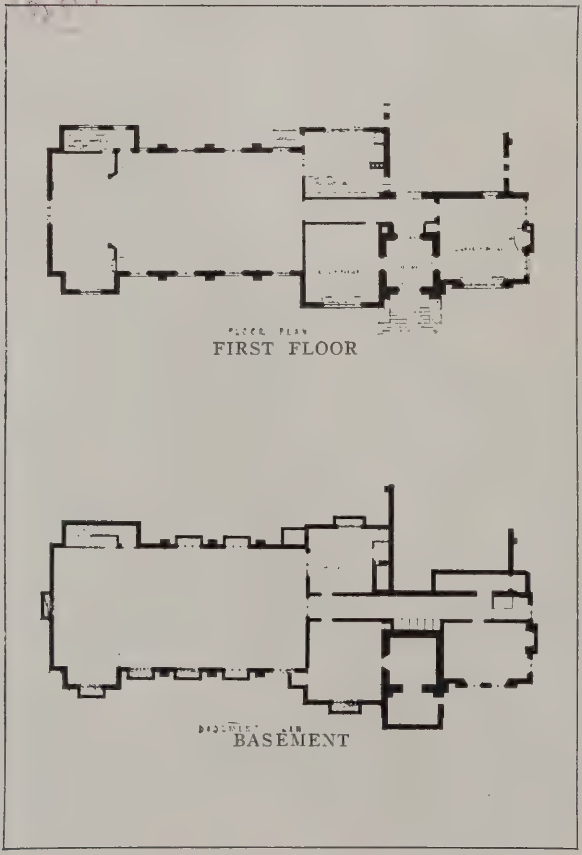


Parish House. St. James the Less, Scarsdale, N. Y.
Hobart B. Upjohn, Architect

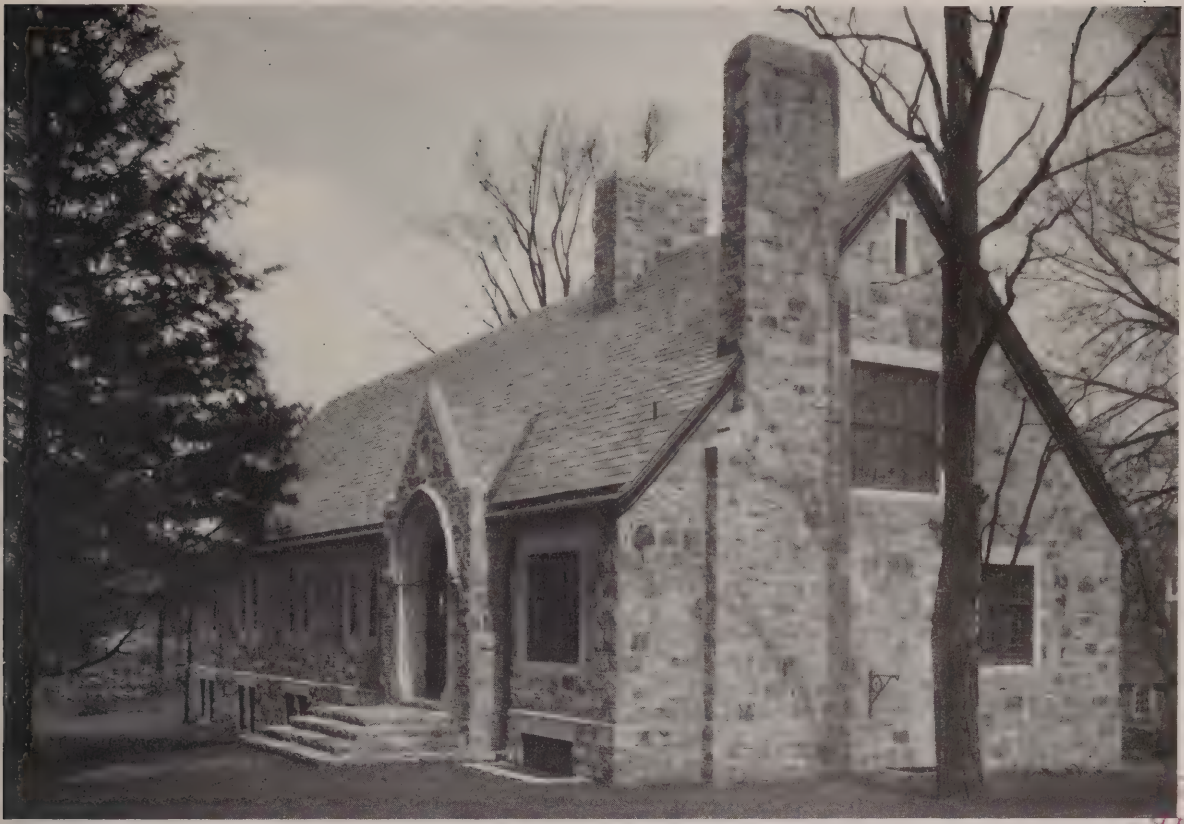
BOSTON



Plans. St. James' Community House, Wilmington, N. C.

other great success is made, and immediately the ship of state feels a lurch, and there follows a list to starboard or port in accordance with whichever way the crowd rushes at the time.

I do not know of a more striking example of the fleeting fame of man than the case of H. H. Richardson. In the early part of the century,—about 1840,—the country was swayed with the desire to build churches in English Gothic style. In England ecclesiastical societies and many members of the Royal Institute of British Architects took up the revival of Gothic which was known as the "Oxford Movement." Many books were written,—books of great value. The clergy of the country were convinced of the logic of using English Gothic in the parishes of the American Church, and hardly a change was made until Mr. Richardson built Trinity Church, Boston. The architects prior to this time might have been divided into two distinct classes,—those who were purists and believed in following the style in a slavish and literal form, and those who, following the ideas of Ruskin, attempted to produce an independent Gothic of the day. Many failures were made in the attempt to produce a new interpretation of Gothic, and it is very properly termed "Victorian Gothic." I wish to accent this very point, for in a good many writings of those times, there is no differentiation made between the two distinct movements. Richardson, in an



Parish House. St. James the Less, Scarsdale, N. Y.
Hobart B. Upjohn, Architect

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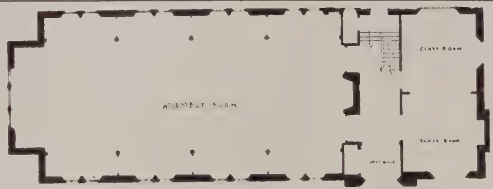
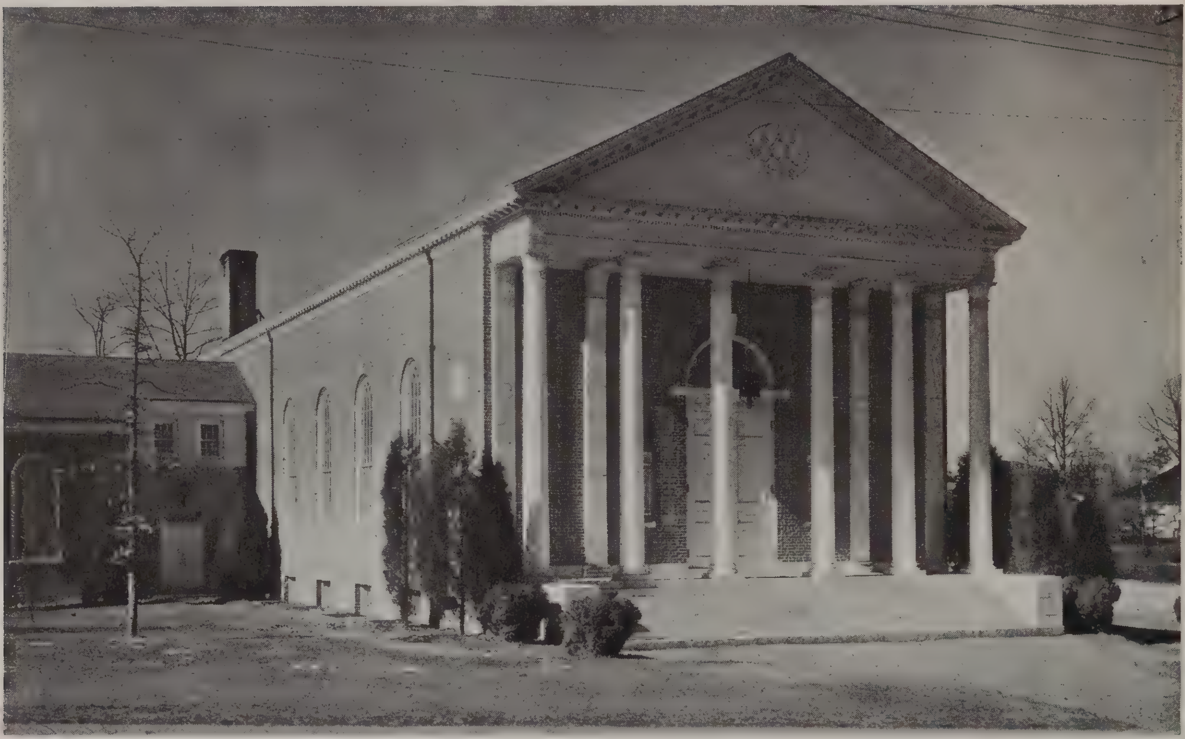


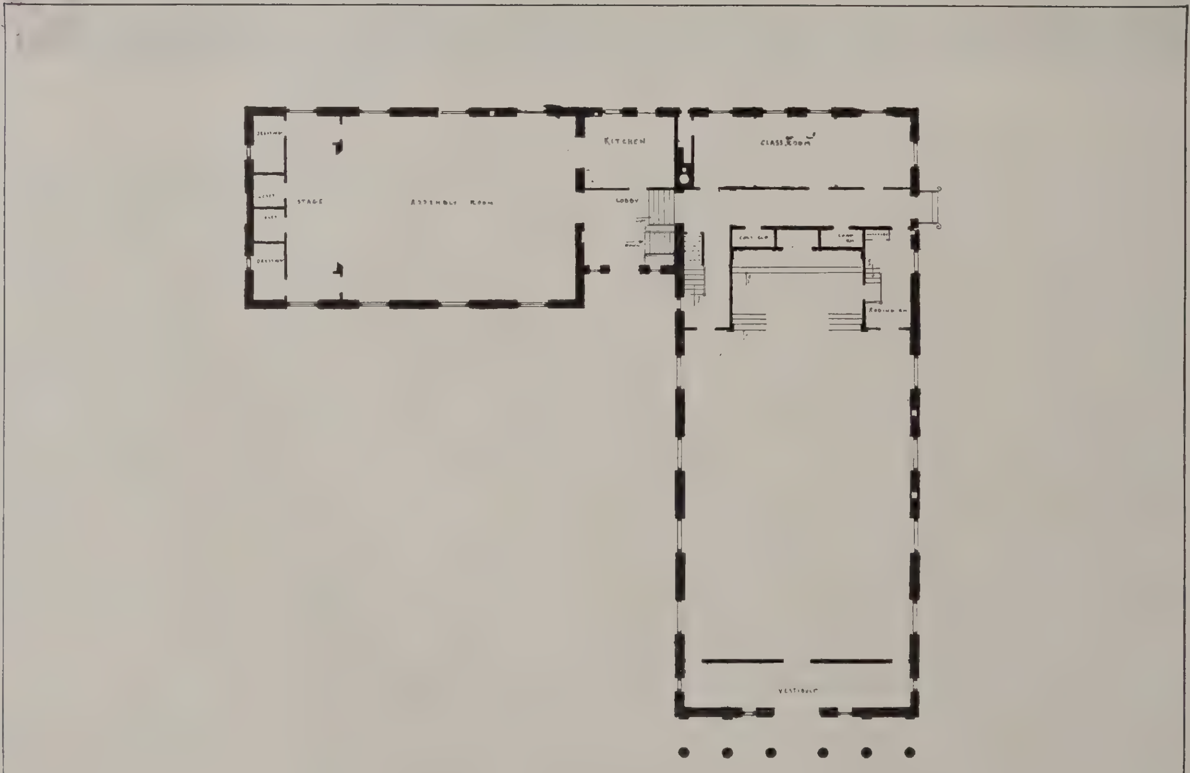
Plan

endeavor to meet the demand for a large open preaching space, being freshly returned from France, after a careful study of the Romanesque, designed Trinity Church on an entirely different theory and in an entirely different style of the day, and it was received by the architects with universal acclamation. Here again was an example of a lurch. Immediately countless architects rushed to the study of the Romanesque, and "picturesque" and "natty" little public libraries were built in this style whose base was strength and vigor, only to fail as architectural masterpieces. It appears to take about 50 years to run the cycle of architecture, and here we find ourselves again returning to another interpretation of the Romanesque,—although the same style very different in treatment. But think for a moment how absolutely in the discard the Romanesque of Richardson's time is now! Also let us realize thoroughly that here is a style which apparently had been used to its ultimate limit only to find that a fresh and new interpretation could be given to it in our day, in no way dominated by earlier adaptations.

Now, because Brown, Jones & Smith have made a success in one particular style, it should not necessarily be a signal for everybody to try to do the same thing. In fact, here we are with enormous architectural resources to draw from, and yet, to cite one example, the design of the east window of Gloucester with its two tremendous buttresses running through the tracery window, having been adapted by a well known firm of architects, has been an insistent signal for its re-adaption by other architects, each time less successfully, over and over again, losing more individuality each time it is copied, for the same reason that repeated reflections in mirrors decrease in intensity, losing much of their precision.

Gothic architecture may be said to have started with the revival of hope after the passing of the year 1000, when many believed all life would cease. Christendom was so relieved when it awakened on January 1, 1001, and found it was still alive, and that no general destruction of the world had taken place, that in sheer thankfulness it was willing to build anything to the glory of





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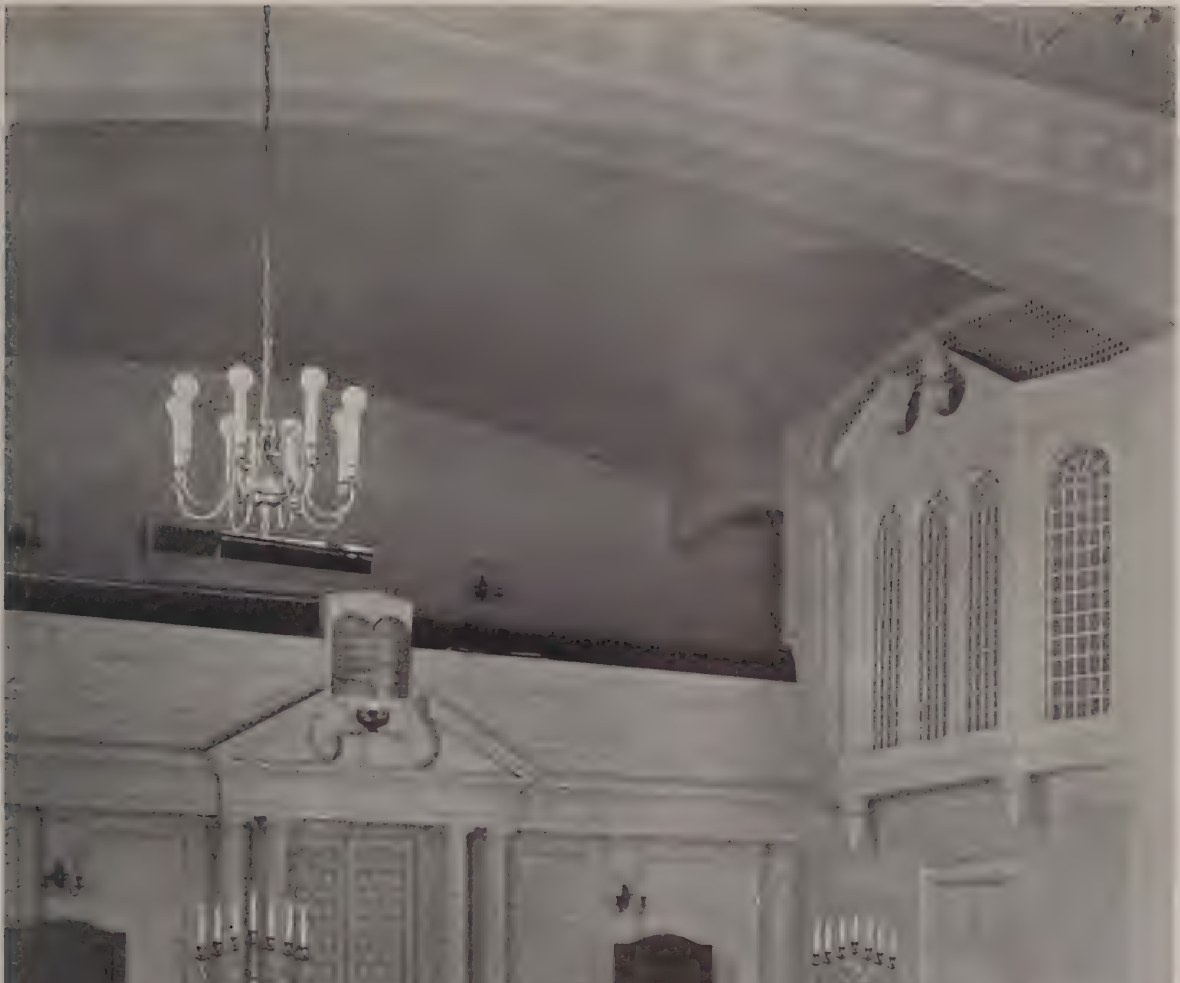
TEMPLE EMANU-EL, GREENSBORO, N. C.
HOBART B. UPJOHN, ARCHITECT



INTERIOR. TEMPLE EMANU-EL, GREENSBORO, N. C.
HOBART B. UPJOHN, ARCHITECT

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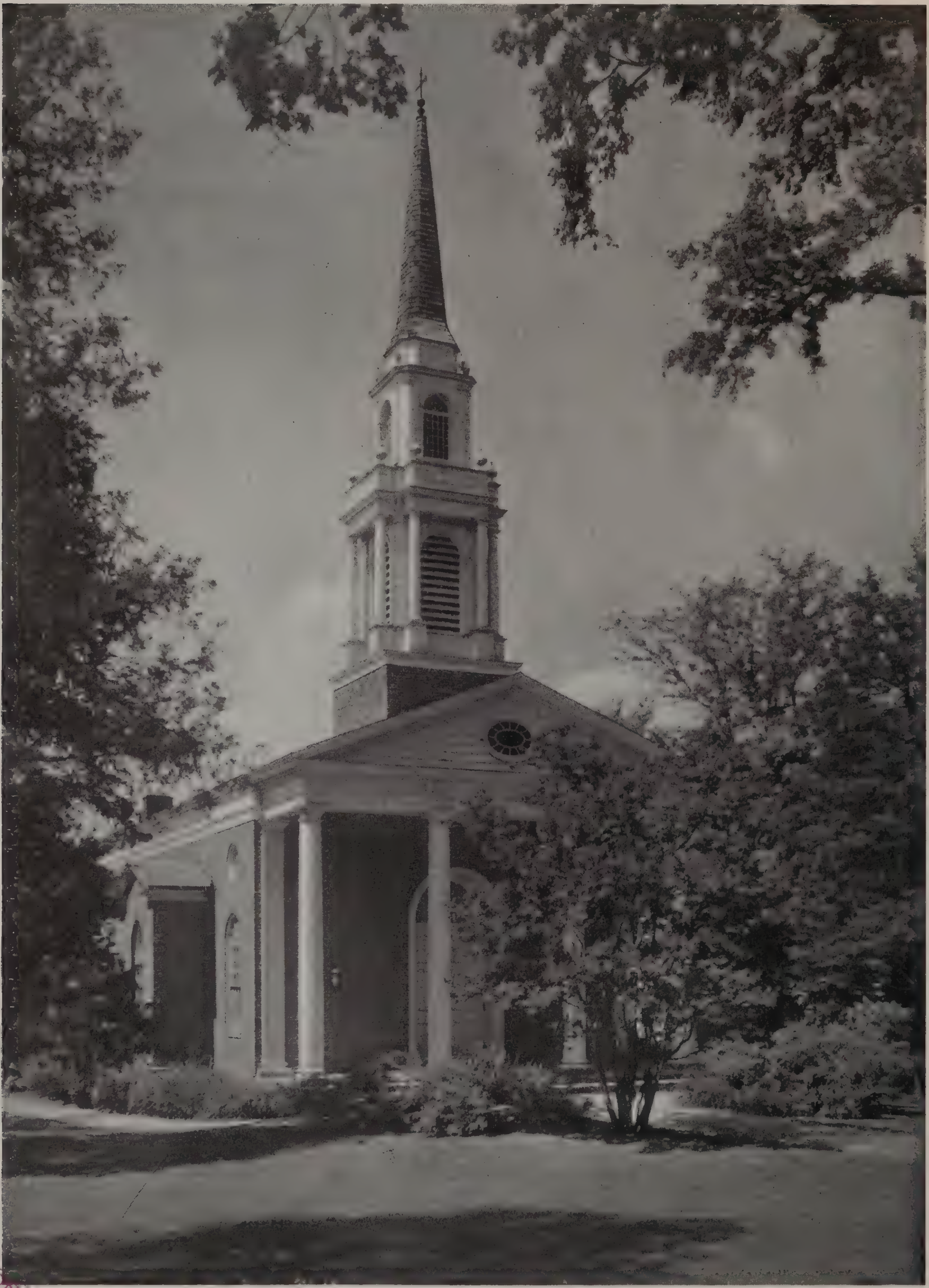

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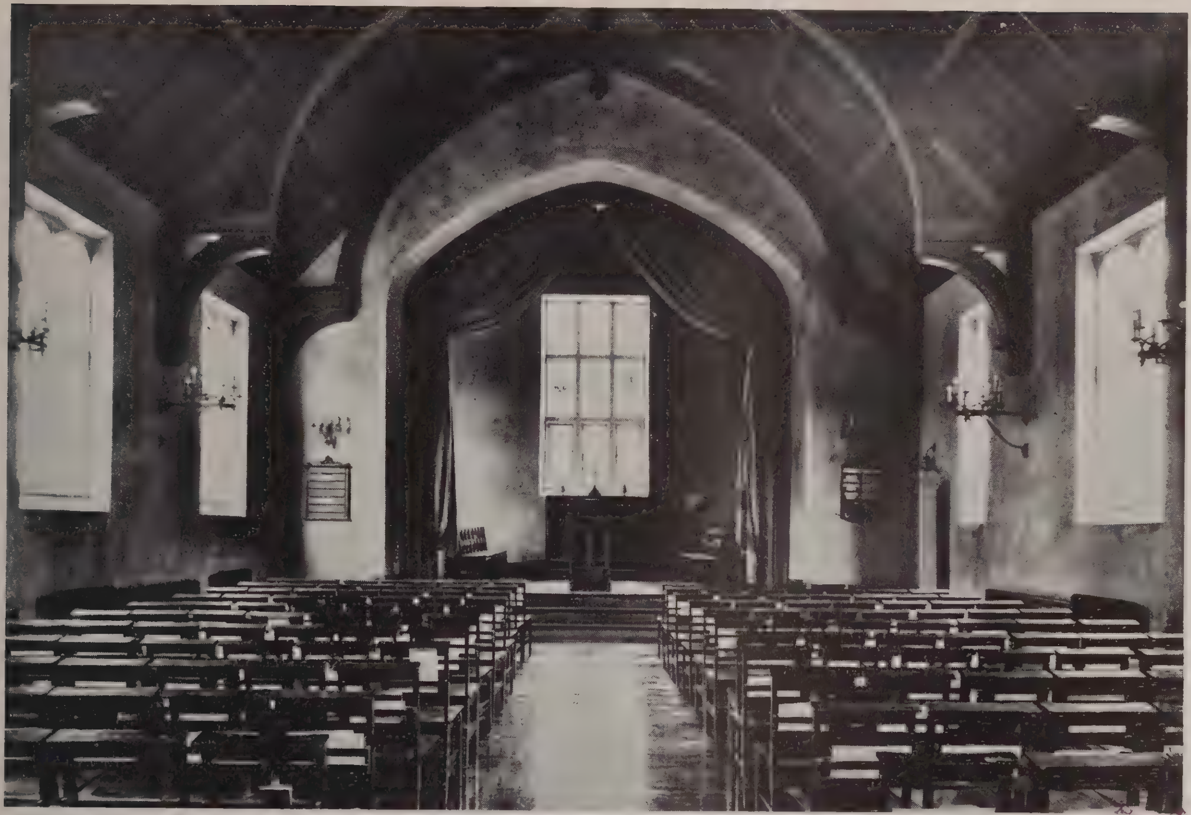
SPRUNT MEMORIAL PRESBYTERIAN CHURCH, CHAPEL HILL, N. C.
HOBART B. UPJOHN, ARCHITECT



ST. JAMES' COMMUNITY HOUSE, WILMINGTON, N. C.
HOBART B. UPJOHN, ARCHITECT

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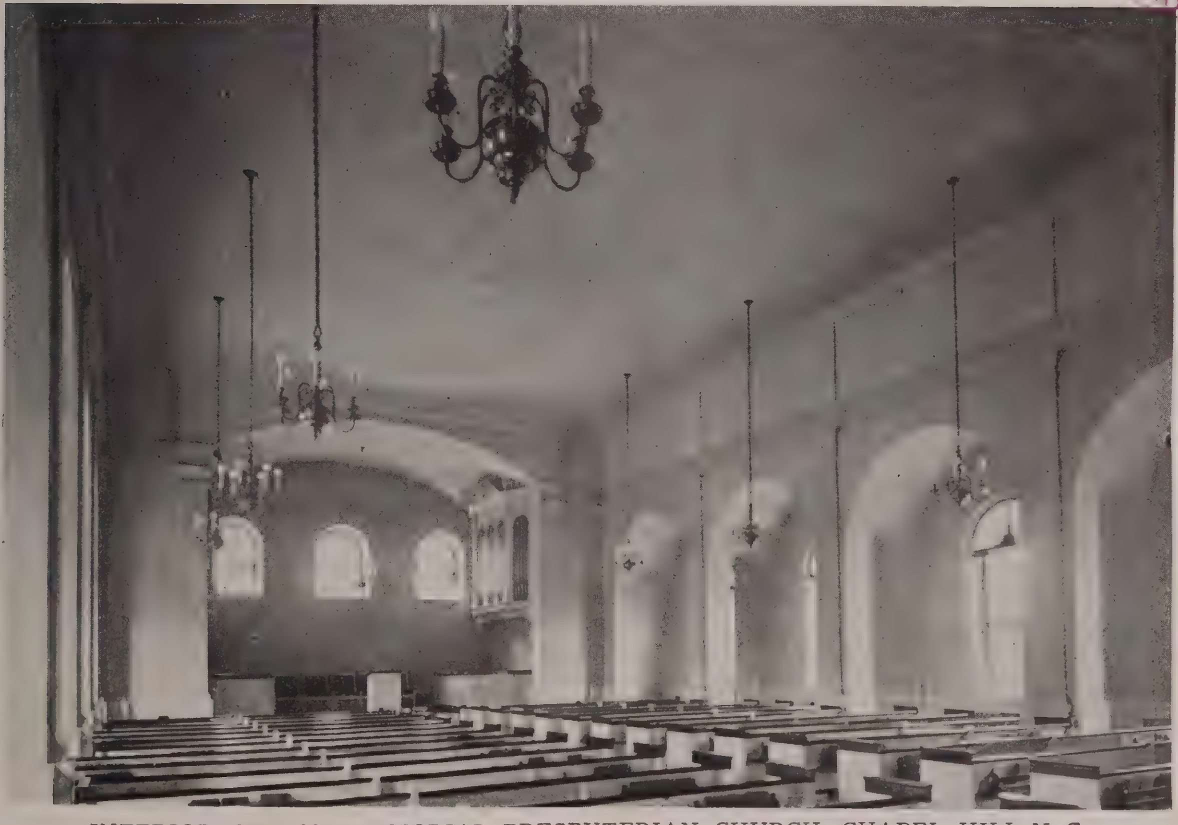

INTERIOR, SPRUNT MEMORIAL PRESBYTERIAN CHURCH, CHAPEL HILL, N. C.
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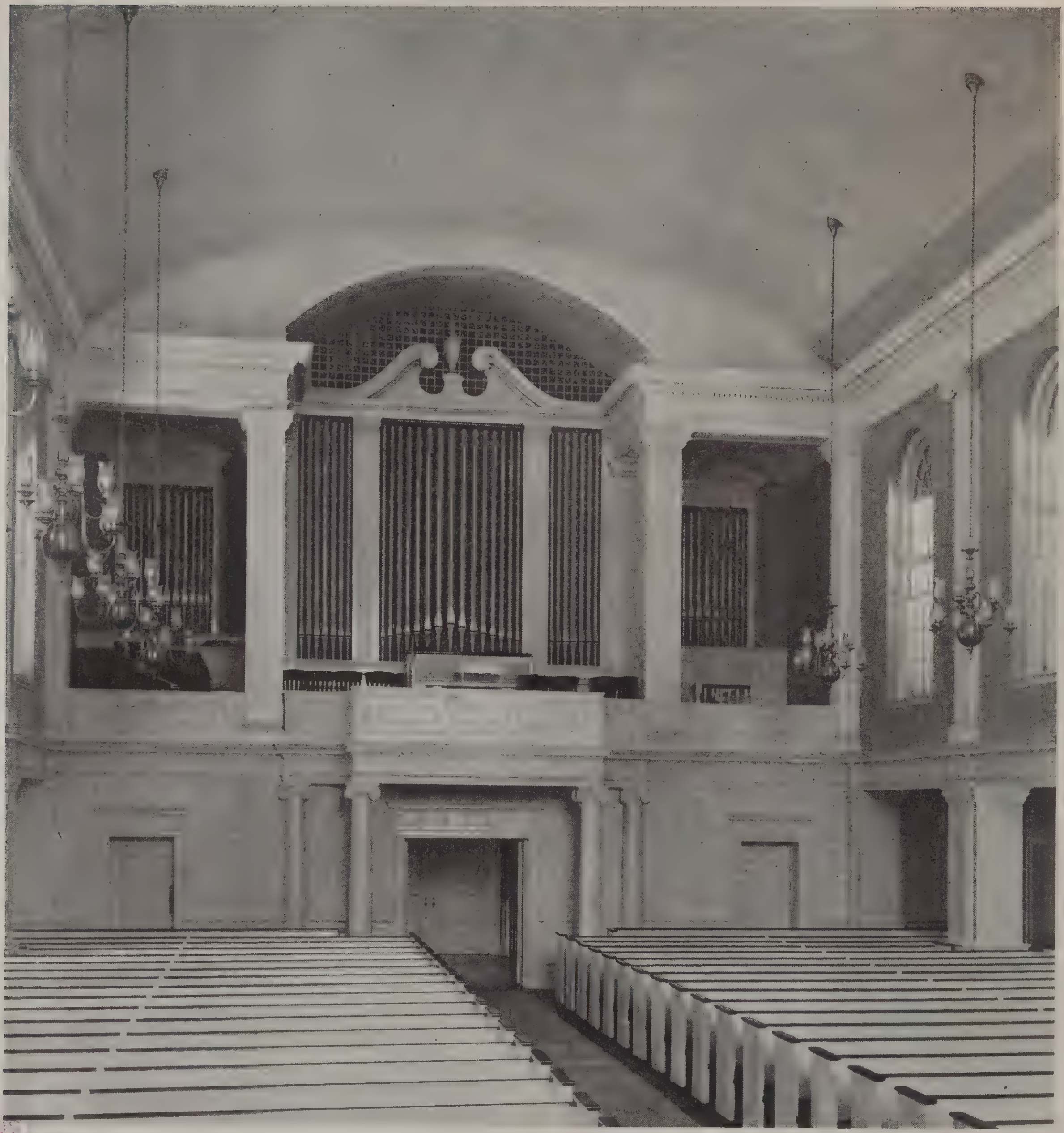

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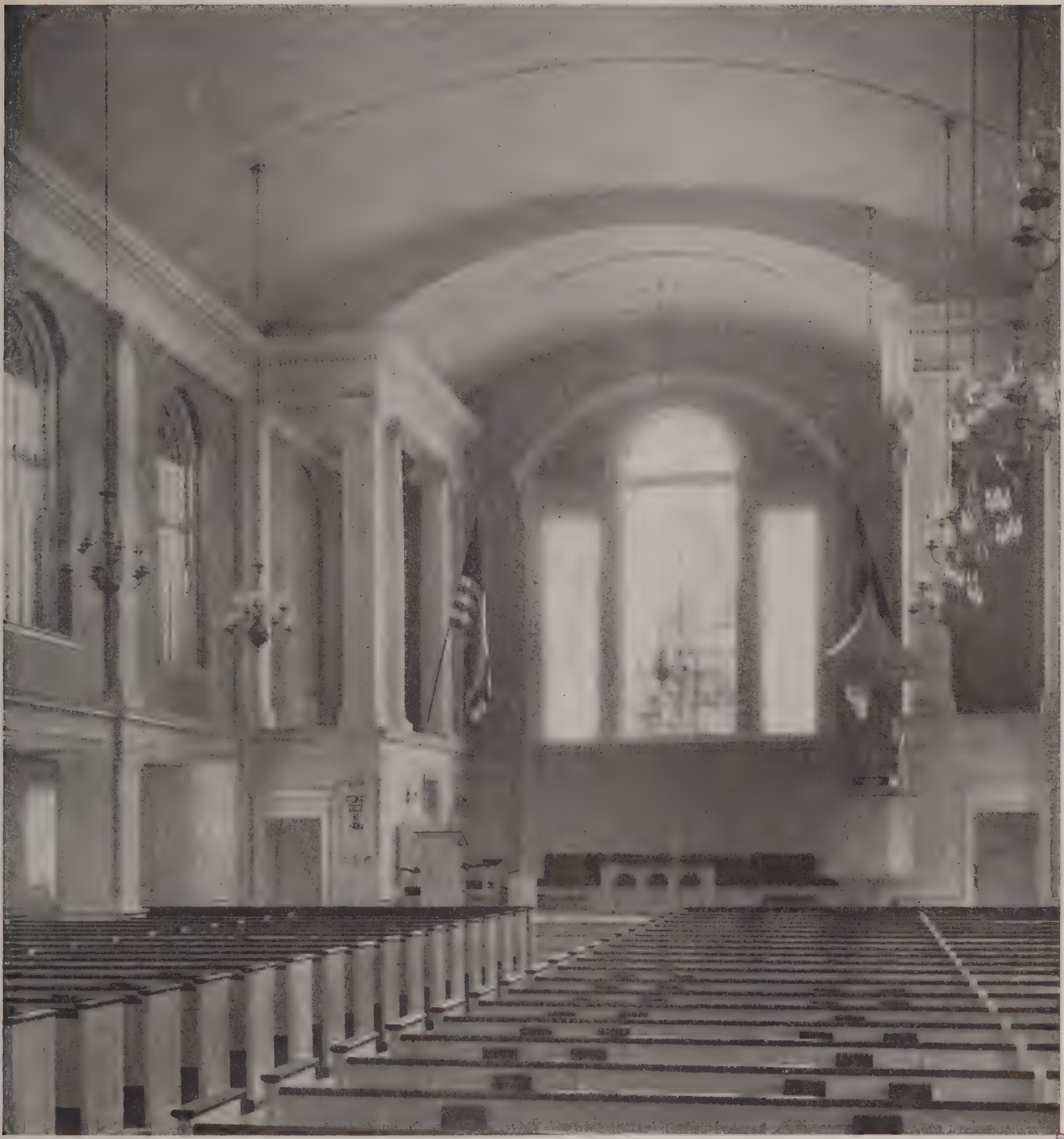
First Presbyterian Church, Concord, N. C.
Hobart B. Upjohn, Architect

God! Perhaps this tragic superstition and pathetic ignorance were the chief causes of the lethargic lack of progress in architecture prior to that date. No doubt it was this that gave rise to the use of the appellation given to the period, which has always been known as the "dark ages." In a sense this term is unfortunate, for I believe it has discouraged many scholars from a deeper study of the period between the time of Justinian and the reign of William the Conqueror. As archæologists go deeper into a study of this era, we are in a way able to account for the structures built during this period, many of which were swept away by the enthusiasm of later generations of builders. We can now realize that the lamp of truth and art did not go out, but merely burned with less intensity, probably slowly growing dim toward the end of this age. The period has left behind it the works of many scholars in the Church, work even more beautiful and intelligent than we had been led to believe existed. However, after the start of the new century, new hope, new vigor, and fresh imagination seized the people. Tremendous desire for learning and thirst for investigation were evidenced by the very large numbers of students that after this time



First Presbyterian Church, Concord, N. C.
Hobart B. Upjohn, Architect

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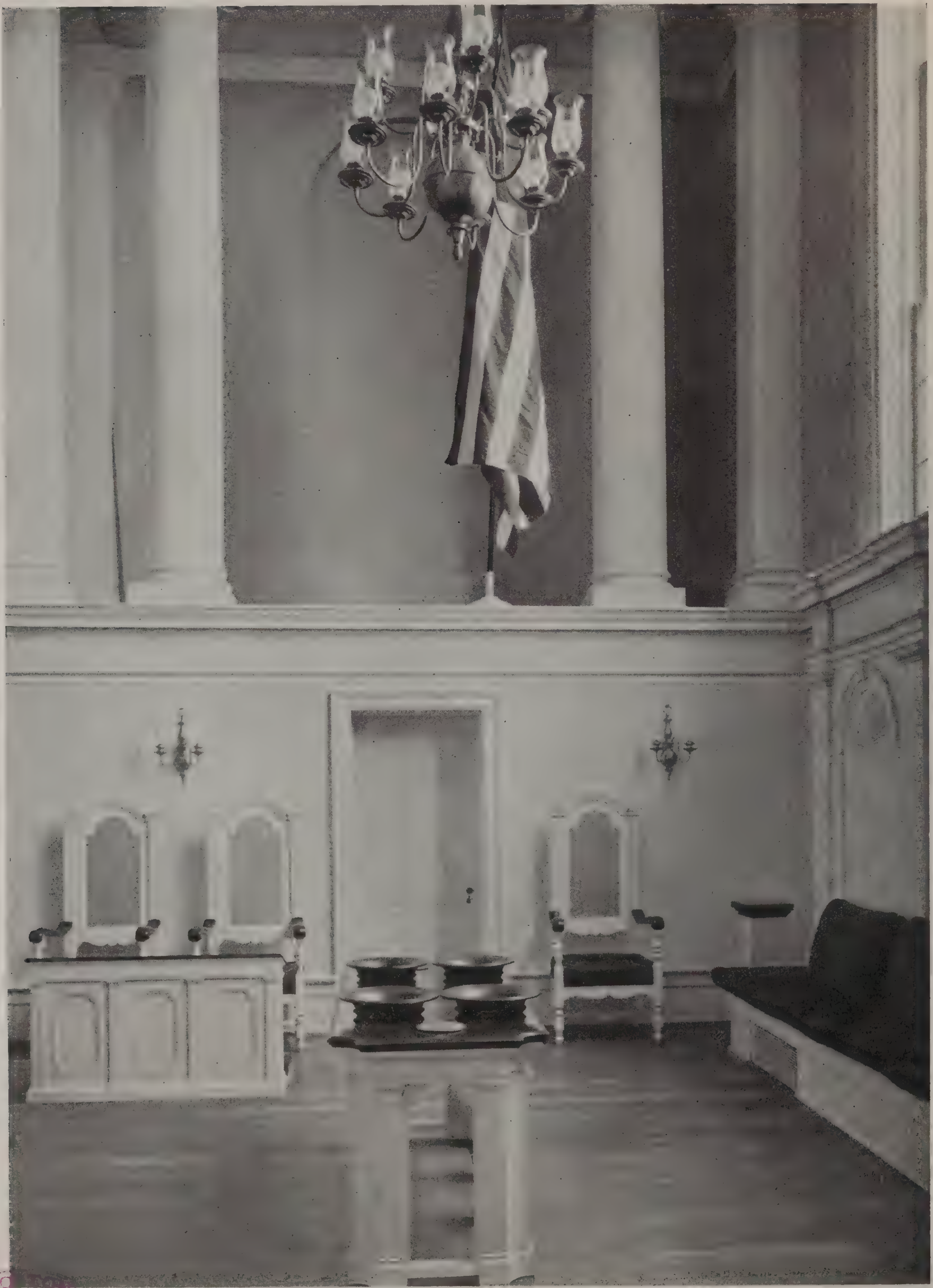
attended the great colleges and centers of learning such as that situated at Jumieges. The monasteries in all Christendom had gathered within their walls the best thinkers of the day. From this source there proceeded a new appreciation of and concentration of attention on art and architecture. The cloister, which was not inhabited solely by the ordained clergy or priests, held within its walls many an architect or artist who entered for the sake of devoting himself to his art for the good of the Church. The very association of churchman, philosopher, illuminator, painter, sculptor and architect was the cause of the production of a transcendent style seldom equaled,—I question ever to be excelled,—by modern civilization, which lacks the consecration and the close intercourse possible only within the walls of a monastery.

Now, let us look at Christendom in the year 1000. What, indeed, did it cover? What should we consider as the civilized world? England, France, Spain, Germany and Italy, together with every portion of the world covered by the Greek Church from Constantinople? Think of it! Did all these nationalities produce but one style? Dozens of nationalities with entirely different per-



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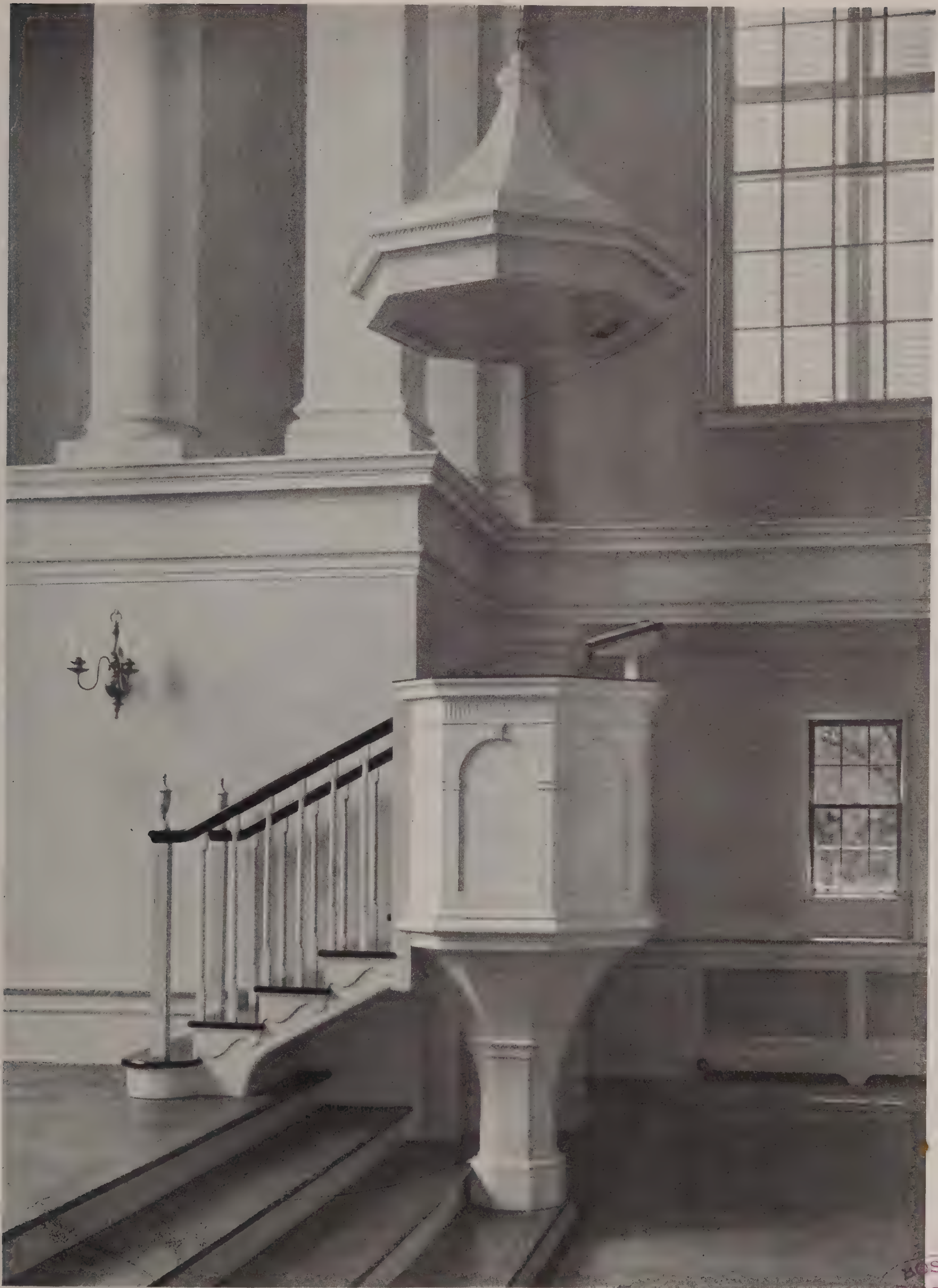
INTERIOR. FIRST PRESBYTERIAN CHURCH, CONCORD, N. C.
HOBART B. UPJOHN, ARCHITECT



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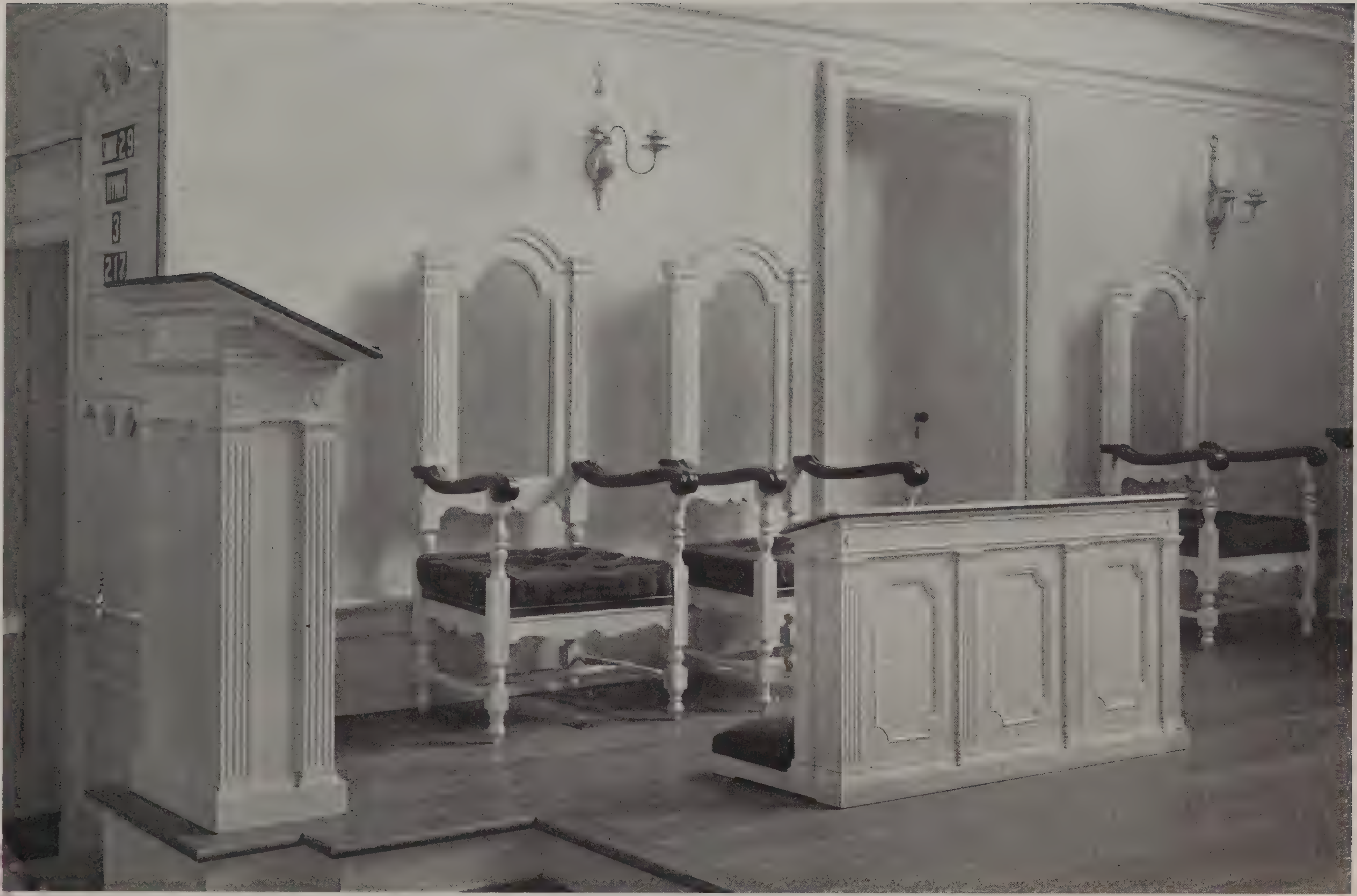

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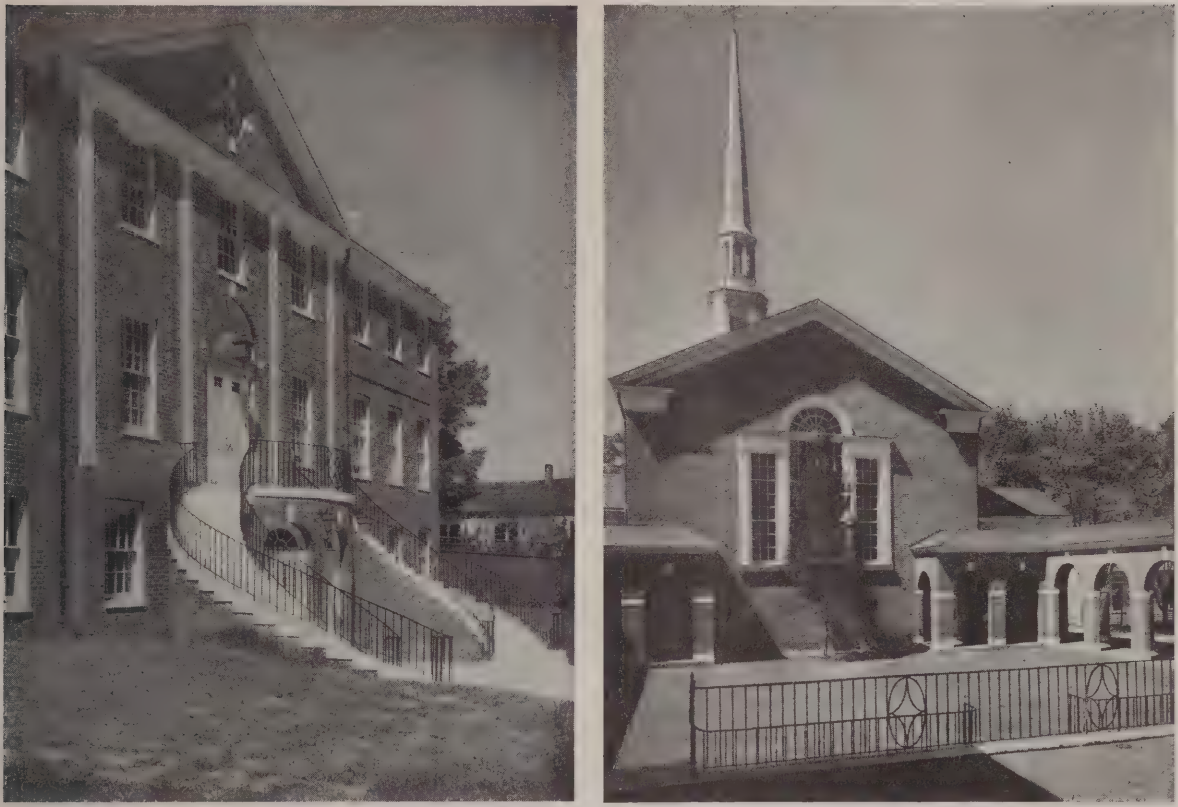
HOBART B. UPJOHN, ARCHITECT



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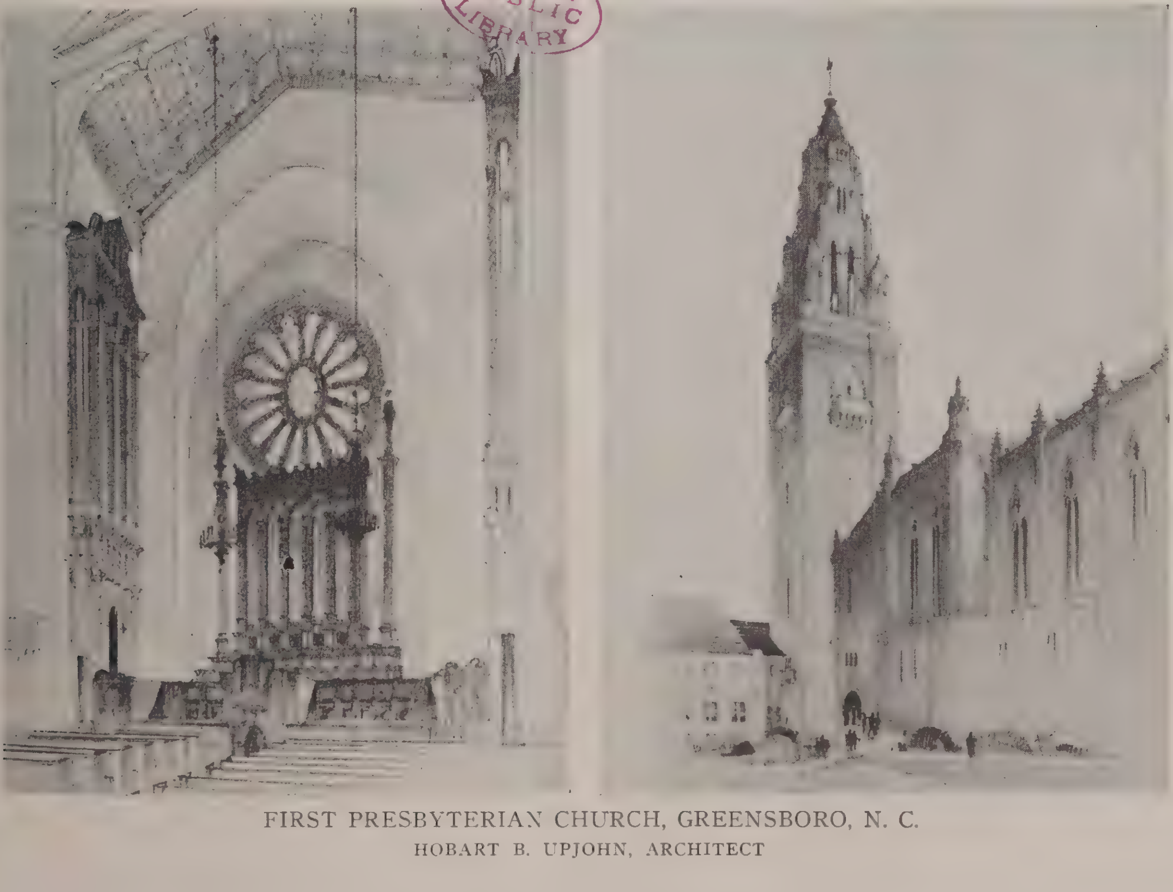

FIRST PRESBYTERIAN CHURCH, GREENSBORO, N. C.
HOBART B. UPJOHN, ARCHITECT

First Presbyterian Church, Concord, N. C.
Hobart B. Upjohn, Architect

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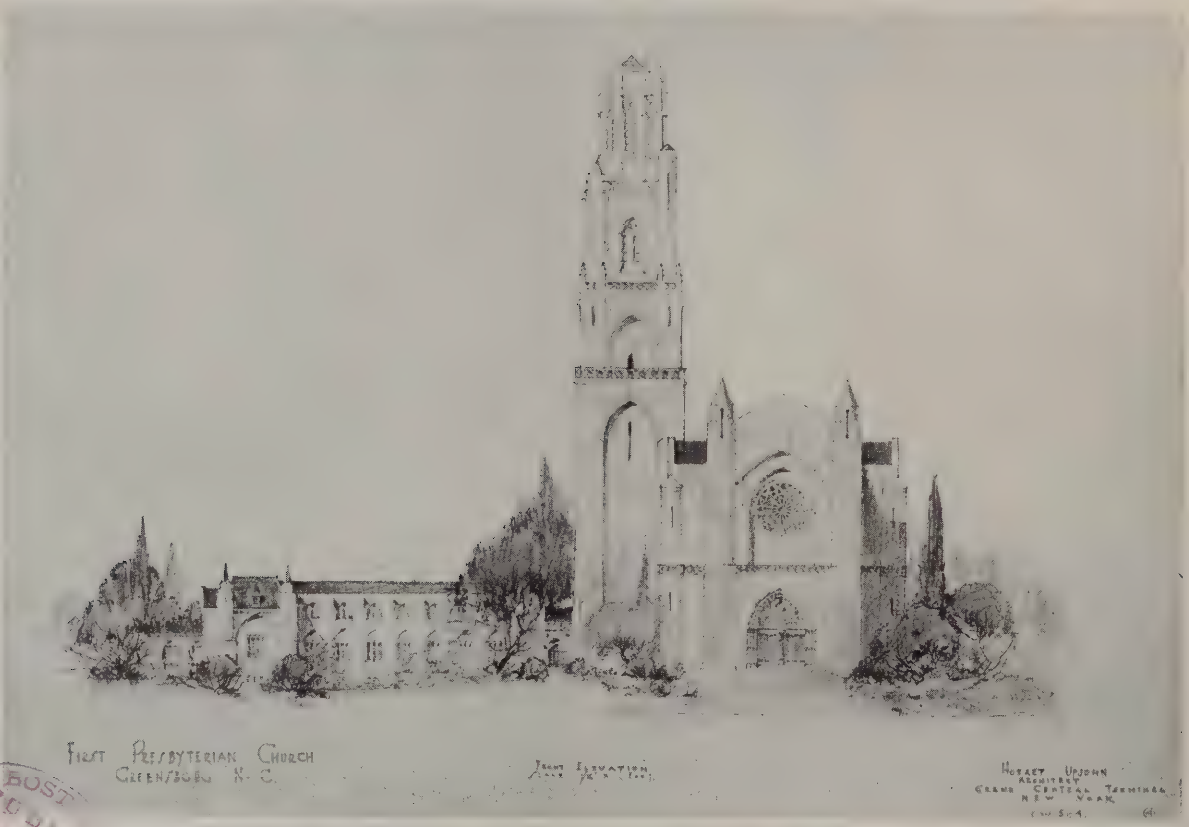
sonalities, confronted with the same problem, taught in the same religion, produced naturally many variations of the concept of a Christian temple. This condition continued and existed practically unbroken for five consecutive centuries. A vast struggling mass of humanity striving for the ideal, striving under varying conditions, produced evident variations and solutions of the same problem. For convenience and classification today, the progress in this particular branch of architecture has been divided, usually by centuries, and each of these styles is again divided into sub-styles, but even this is hardly a fair or accurate method of sub-division. Now, if out of this great mass we merely confine ourselves to material of those countries which used the Gothic style,—and when I use the term "Gothic" in this sense, I do not mean to confine it to the narrow definition of Professor Moore—I mean Gothic in its broadest possible sense,—we may say that the great countries in which the style attained sufficient use to be recognizable as a style were England, France, Germany, Spain and Italy. Here we are in the year 1929, the most modern year of this very modern decade, and we have recorded for us as a profession by the cameras, the artists and the writers the most remote, the most intimate features of this style. Shall we, as the architects of this great country of ours, stand impotent, unimaginative, when we consider the problems that are before us? Why should we constantly follow the same models? What shall be our interpretation of today? Are we planning to solve the problems of architectural design in any adequate way? It has been the experience of the past that scholars have confined themselves largely to the teaching of the Classic and Renaissance. One believes that the reason is not that the Gothic is less worthy of being taught, but that it is more difficult to master.

In former times it was the custom to serve an apprenticeship of a stated period. No doubt the architects who graduated from architects' offices as apprentices passed through a period corresponding to the apprenticeship of the painter, of being paint boys and helpers. It is certain that outstanding excellence of design cannot be obtained with a superficial study of the subject, and it is exceedingly hard for the architect who has established a good general practice to devote the time to study the subject as it deserves. I have had many talks with architects of national prestige in commercial work who have said they could not afford to design churches. On the other hand, I am exceedingly desirous of not discouraging the young and ambitious practitioner from trying his hand at church architecture. But certain it is that much study is necessary, and the serving of a certain amount of time in the office of an architect who specializes in churches is most essential. Here one becomes familiar with many of the mistakes and pitfalls which are in the way of creating a good design, and learns to avoid them.

The colleges might readily devote special courses and study to ecclesiastical architecture. It is so different in its handling and principles that it deserves special attention more than does general practice. Perhaps providing special elective courses would be the solution for the educational side. Constant study not only improves one's taste but increases one's enjoyment of the subject. A system of mental cross-indexing is one of the most fascinating of amusements which an architect experiences. Probably the safest method is the following of established styles, especially those which have stood the tests of time and taste. Certainly for the beginner this should be the rule. On the other hand, one should study all styles and particularly all solutions of different problems in order to be equipped to meet an unusual situation. I do not wish to discourage the study of contemporaneous work. It is most valuable, and in fact through this means the great body of architects are adding day by day to the thoughts and principles which will become the basis of our interpretation.

Let us look at the education and work of one of the masters of this style in our day,—Bertram Grosvenor Goodhue. He was not a graduate of any recognized school of architecture. He worked for some years under the guiding eye of Renwick, in whose office he received his early training and formed his taste. In these days his style, which was very pure, followed that of the English parish church in a careful although free manner. His later work, which was most free, always ran back in its roots to an established style. America has not produced a more independent thinker or a greater master of ecclesiastical style, a style always free, vigorous and independent. Had he lived he would have produced a style as thoroughly characteristic of our time and our country as that of any of the great periods of the past. His superb taste has already made an indelible impression on our country, and yet the delightful subtleties of his work are not easily grasped or adopted by others. It seems to be a natural law that no second mind can completely grasp and interpret the taste and style of a master. This was decidedly so with Aubrey Beardsley. There have been many who have tried to copy his style and some who have succeeded in a similar use of the pen, but there never will be another Aubrey Beardsley! So there will never again be another Goodhue, although his influence will survive and by use of his style others will attain distinction.

First Presbyterian Church,
Concord, N. C.
Hobart B. Upjohn, Architect



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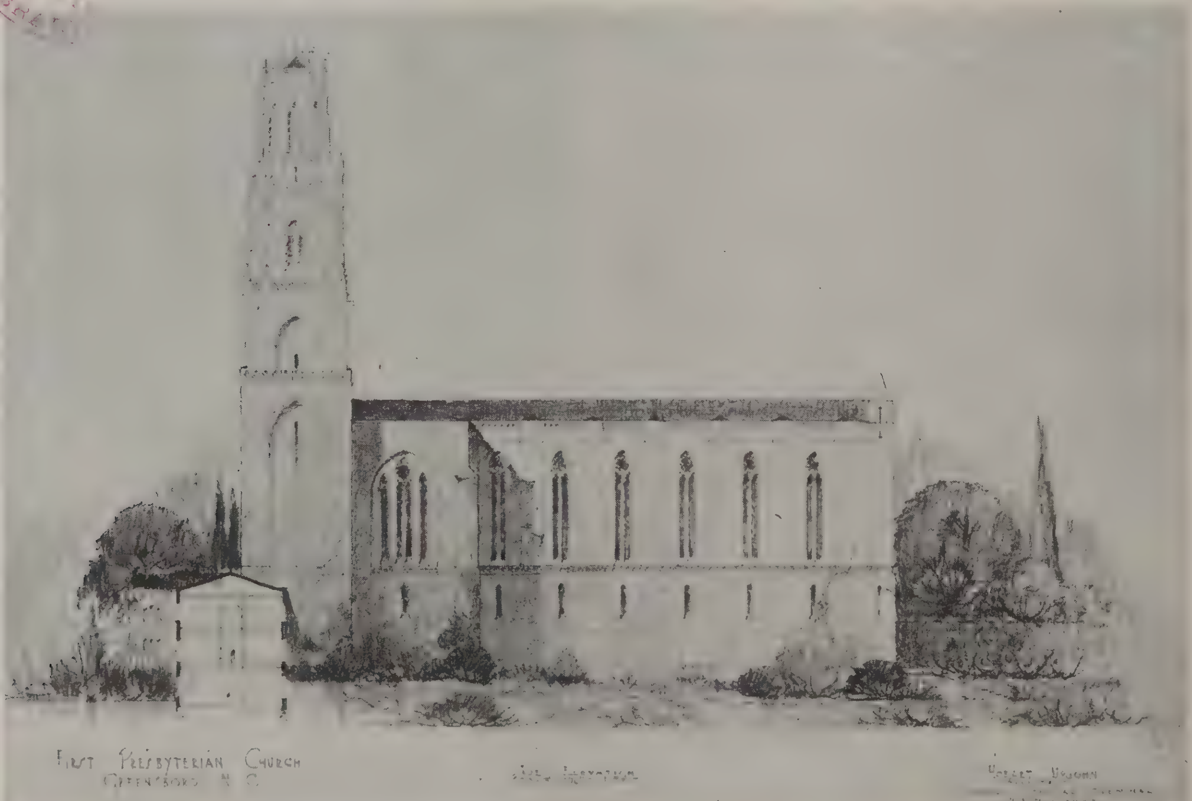
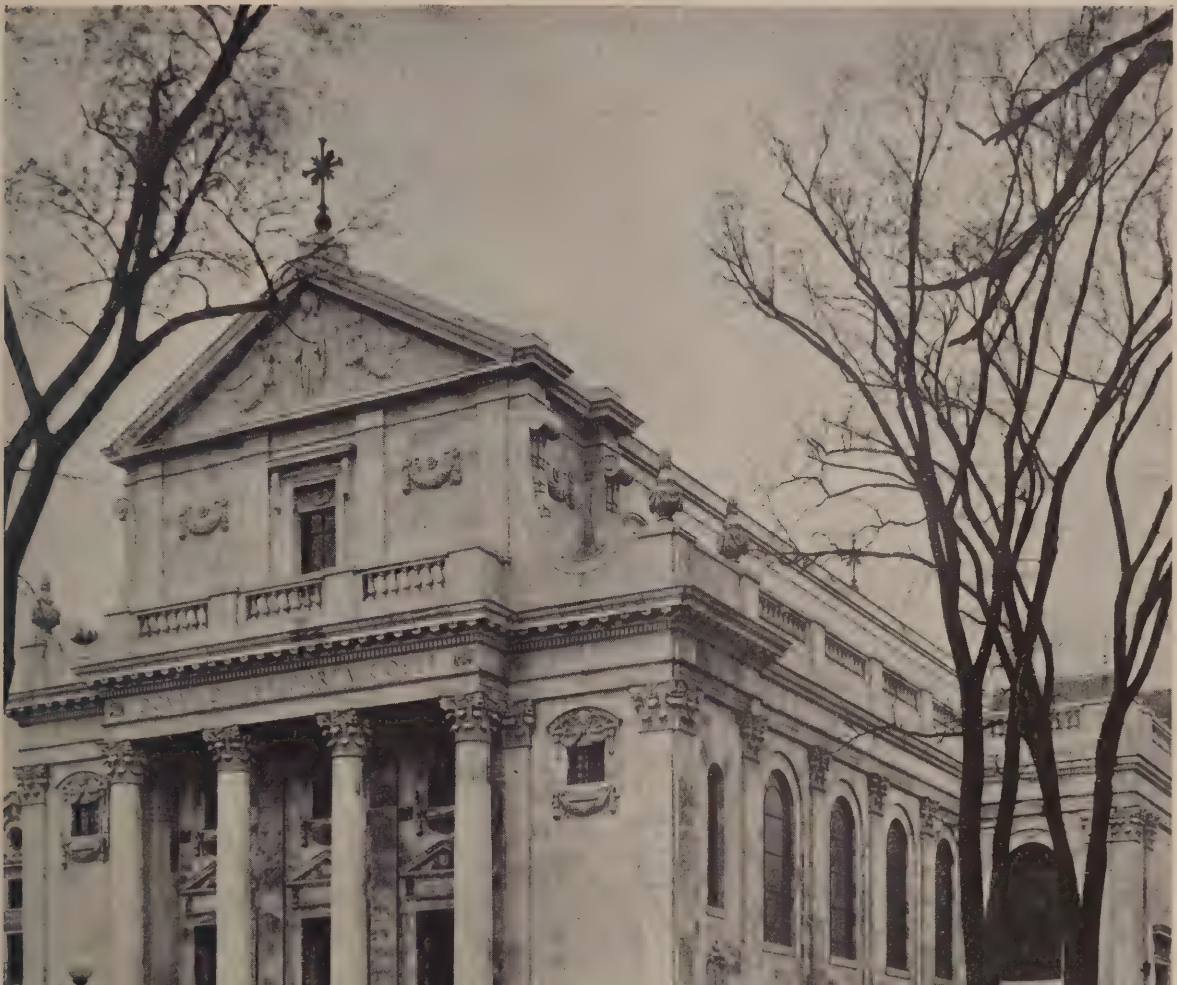


FIRST PRESBYTERIAN CHURCH, GREENSBORO, N. C.
HOBART B. UPJOHN, ARCHITECT



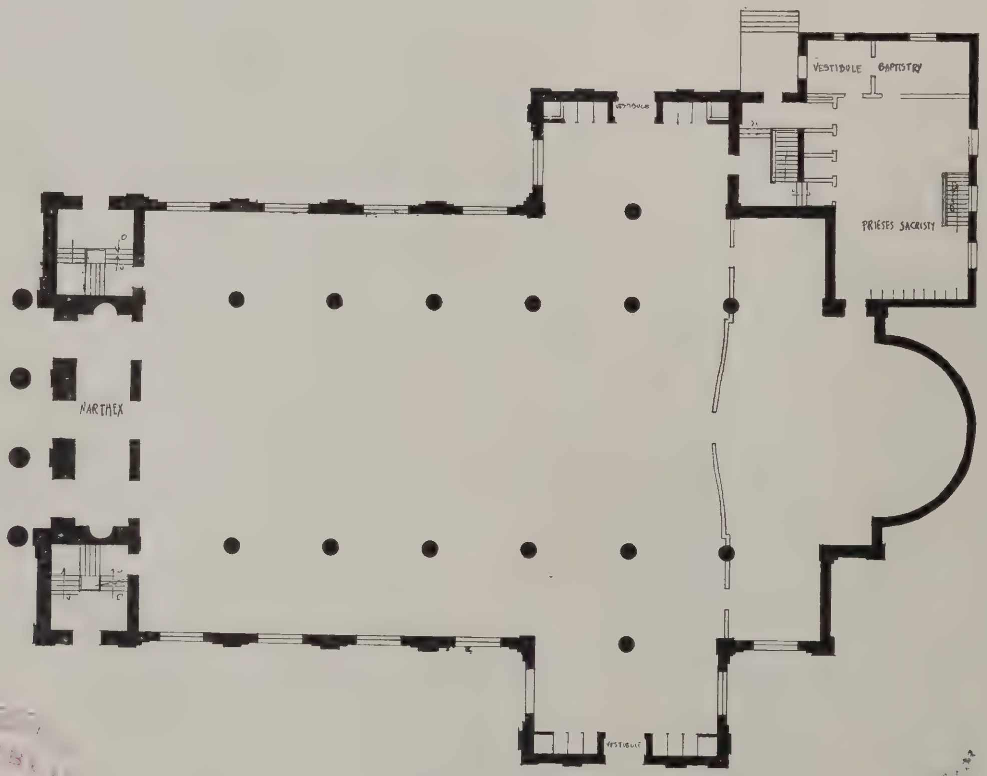
Photos. Paul J. Weber

Plan on Back

CHURCH OF THE IMMACULATE CONCEPTION, WATERBURY, CONN.
MAGINNIS & WALSH, ARCHITECTS

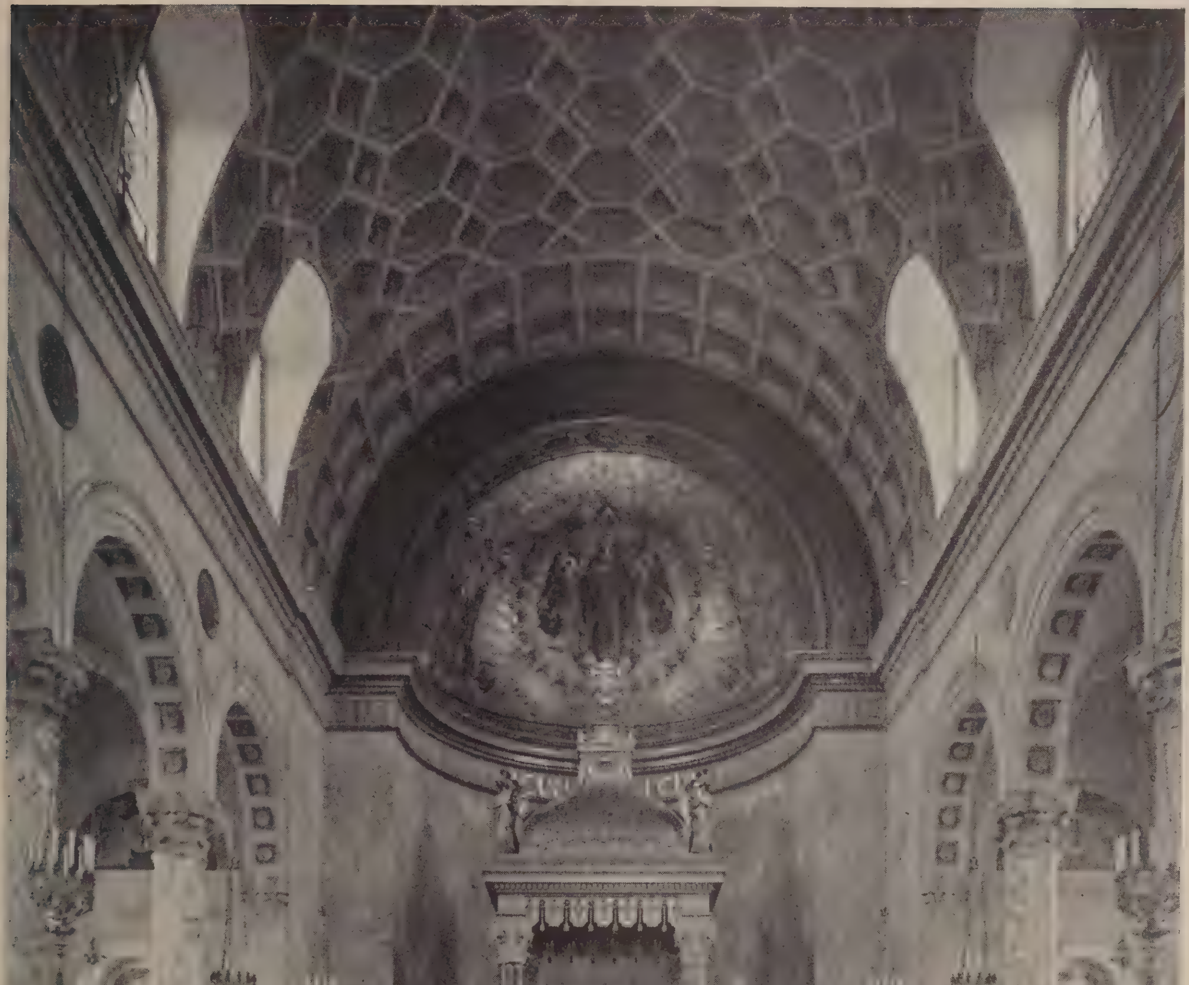
CONSTRUCTION DATA

Date of Completion: October, 1928.
Type of Construction: First class.
Exterior Materials: Limestone.
Roof: Fire flashed Spanish tile.
Floors: Marble and terrazzo.
Windows: Metal windows.
Interior Materials: Stone, marble columns and marble facing of sanctuary.
Heating: Vacuum steam heating system.

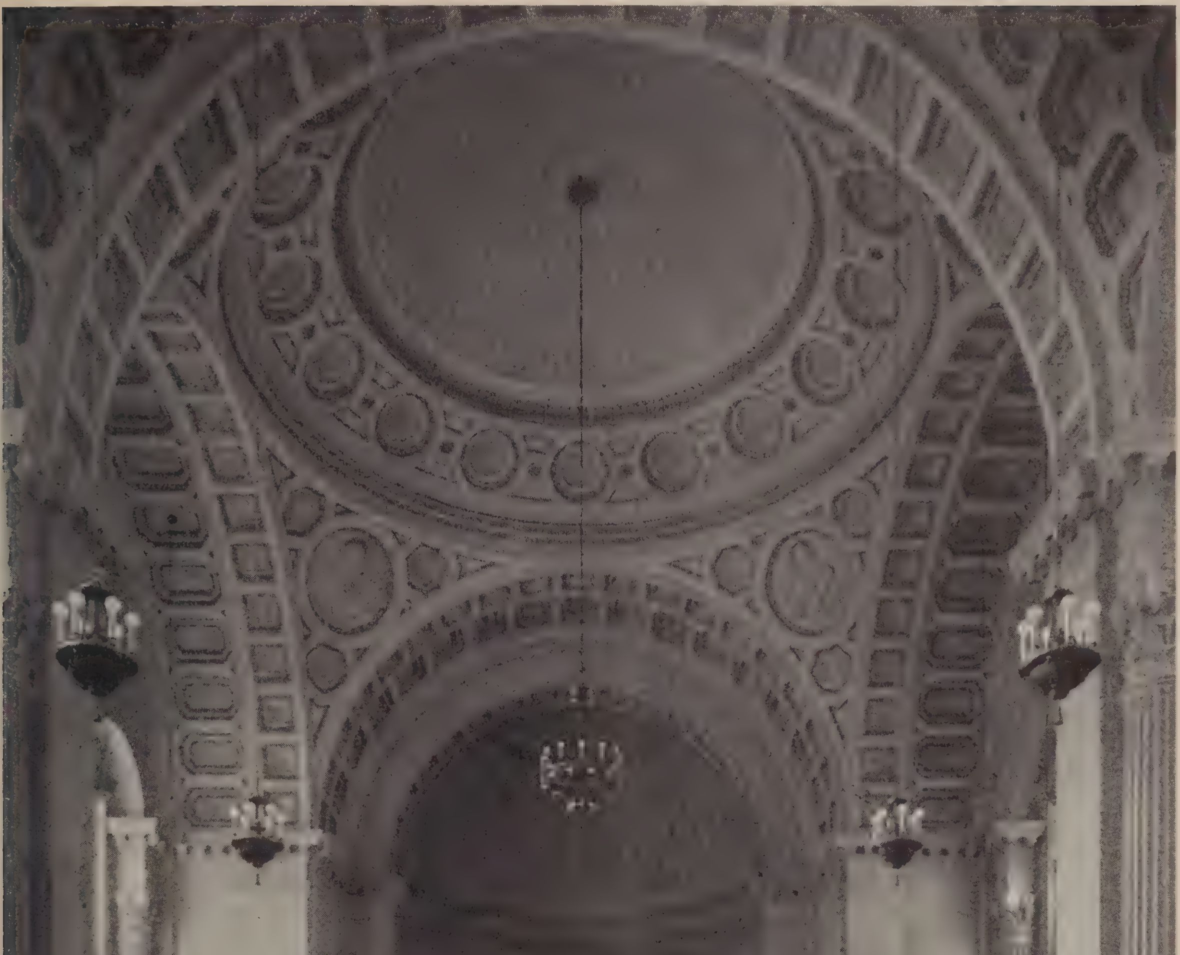


FIRST FLOOR

PLAN: CHURCH OF THE IMMACULATE CONCEPTION, WATERBURY, CONN.
MAGINNIS & WALSH, ARCHITECTS



CHURCH OF THE IMMACULATE CONCEPTION, WATERBURY, CONN.
MAGINNIS & WALSH, ARCHITECTS



Photos. Paul J. Weber

CHAPEL, SCHOLASTICATE OF THE SOCIETY OF JESUS, WESTON, MASS.

MAGINNIS & WALSH, ARCHITECTS

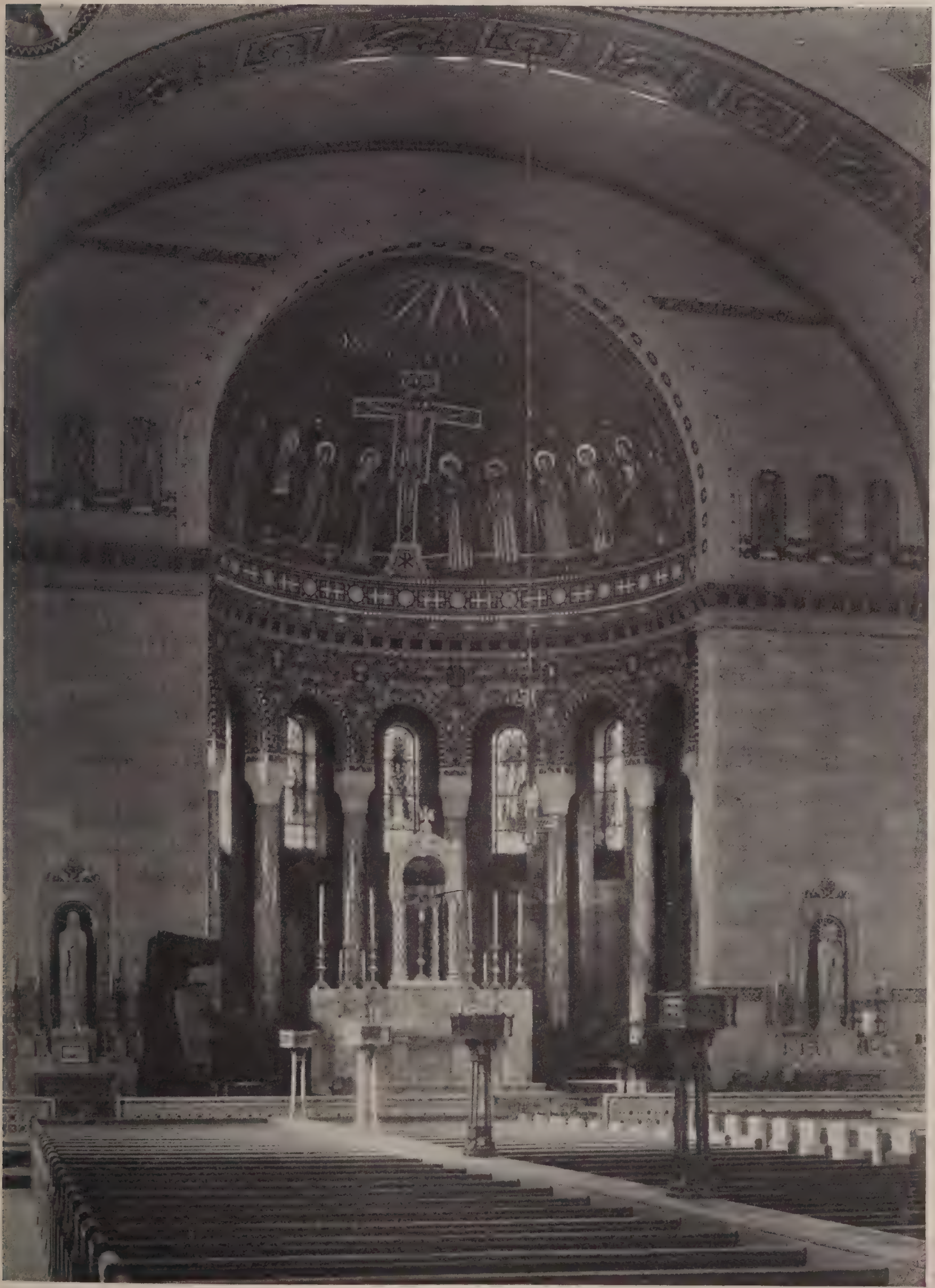
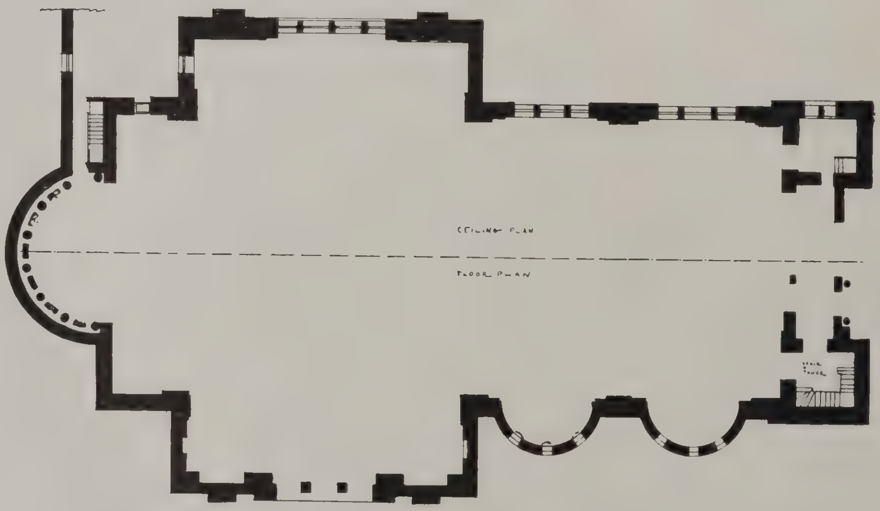


Photo. E. Stanley Hart, Jr. *Plan on Back*

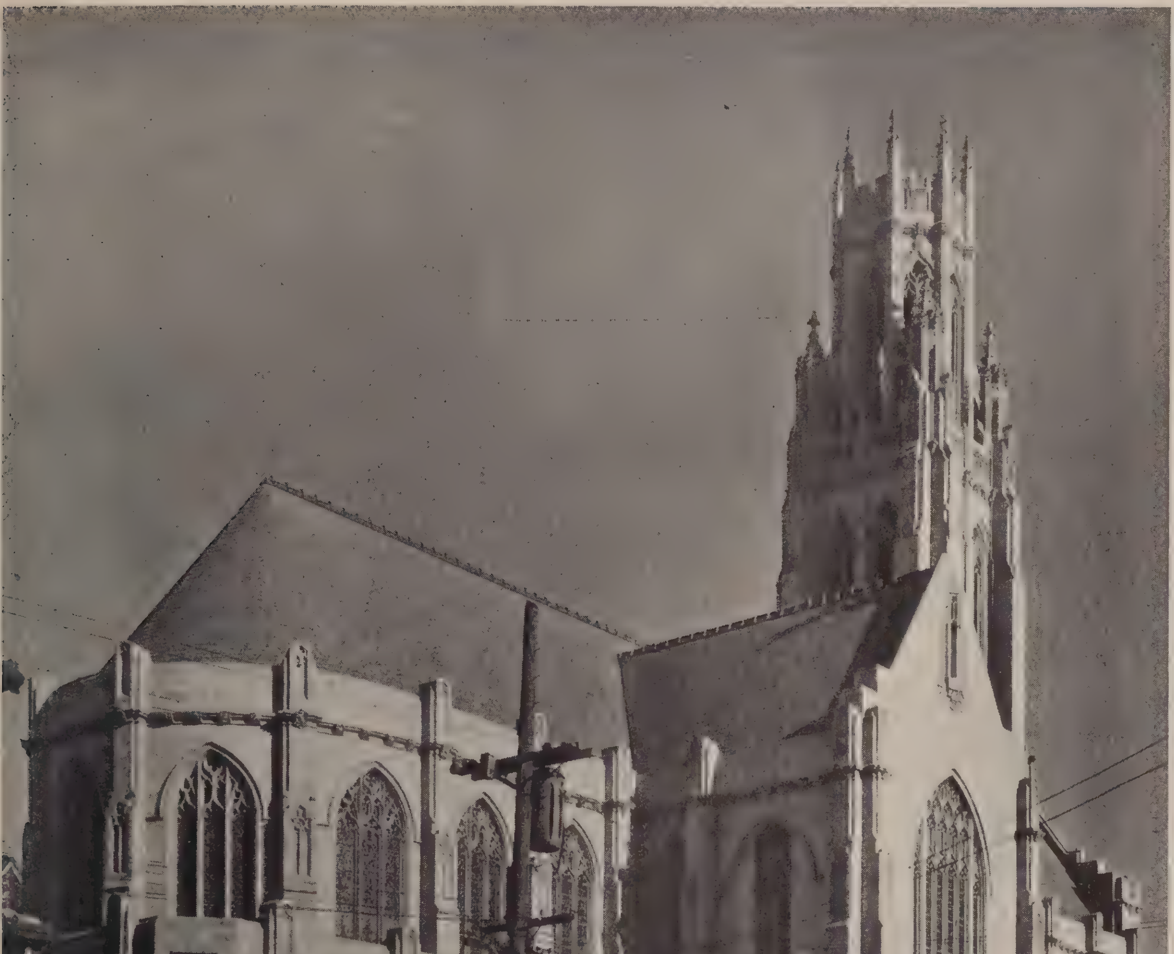
CHURCH OF THE TRANSFIGURATION OF OUR LORD, PHILADELPHIA
HENRY D. DAGIT & SONS, ARCHITECTS

COST AND CONSTRUCTION DATA

Date of Completion: June 1, 1928.
Type of Construction: Fireproof.
Exterior Walls: Limestone and granite trim.
Roof: Slate
Floors: Sanctuary and aisles, terrazzo and marble mosaics. Under pews, maple on sleepers.
Heating: Vapor system with oil burners.
Electrical Equipment: Indirect, covers lighting with reflectors controlled by dimmers
Cubage of Building: 835,000 feet.
Cubic Foot Cost: 83 cents.
Total Cost of Building: $700,000.



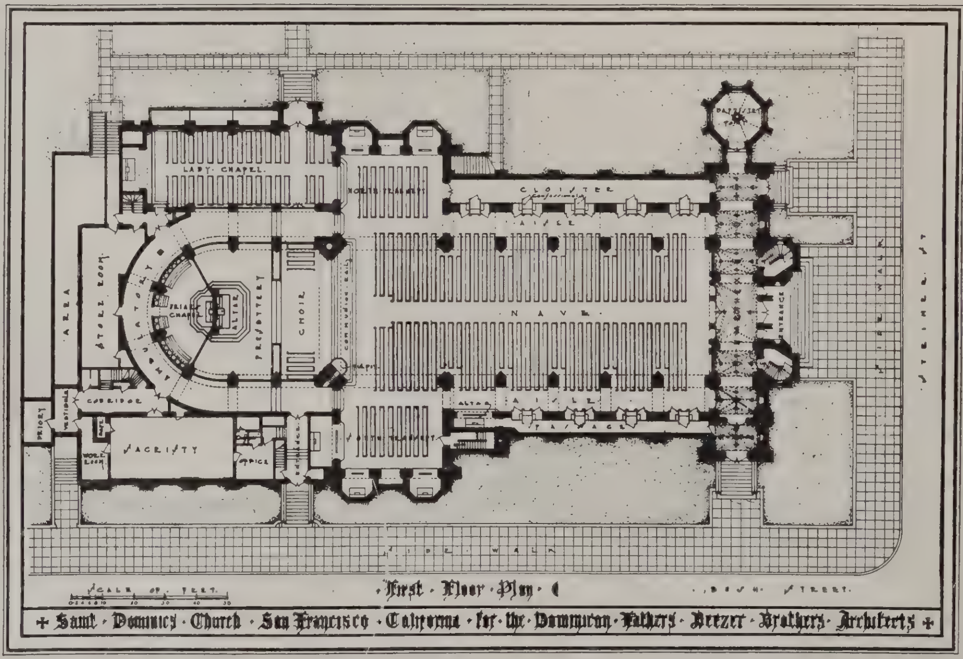
PLAN: CHURCH OF THE TRANSFIGURATION OF OUR LORD, PHILADELPHIA
HENRY D. DAGIT & SONS, ARCHITECTS



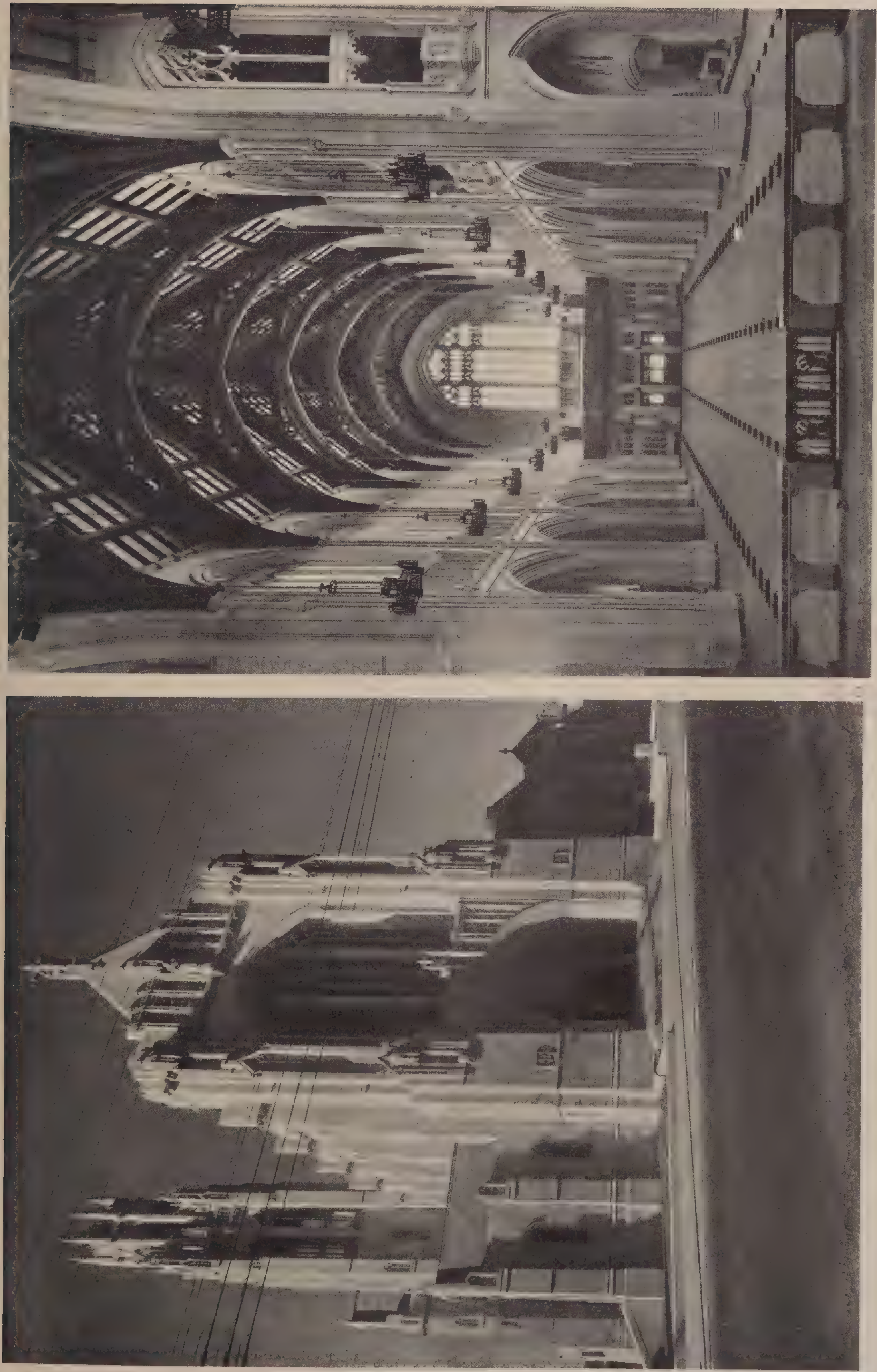
Photos. Gabriel Moulin

Plan on Back

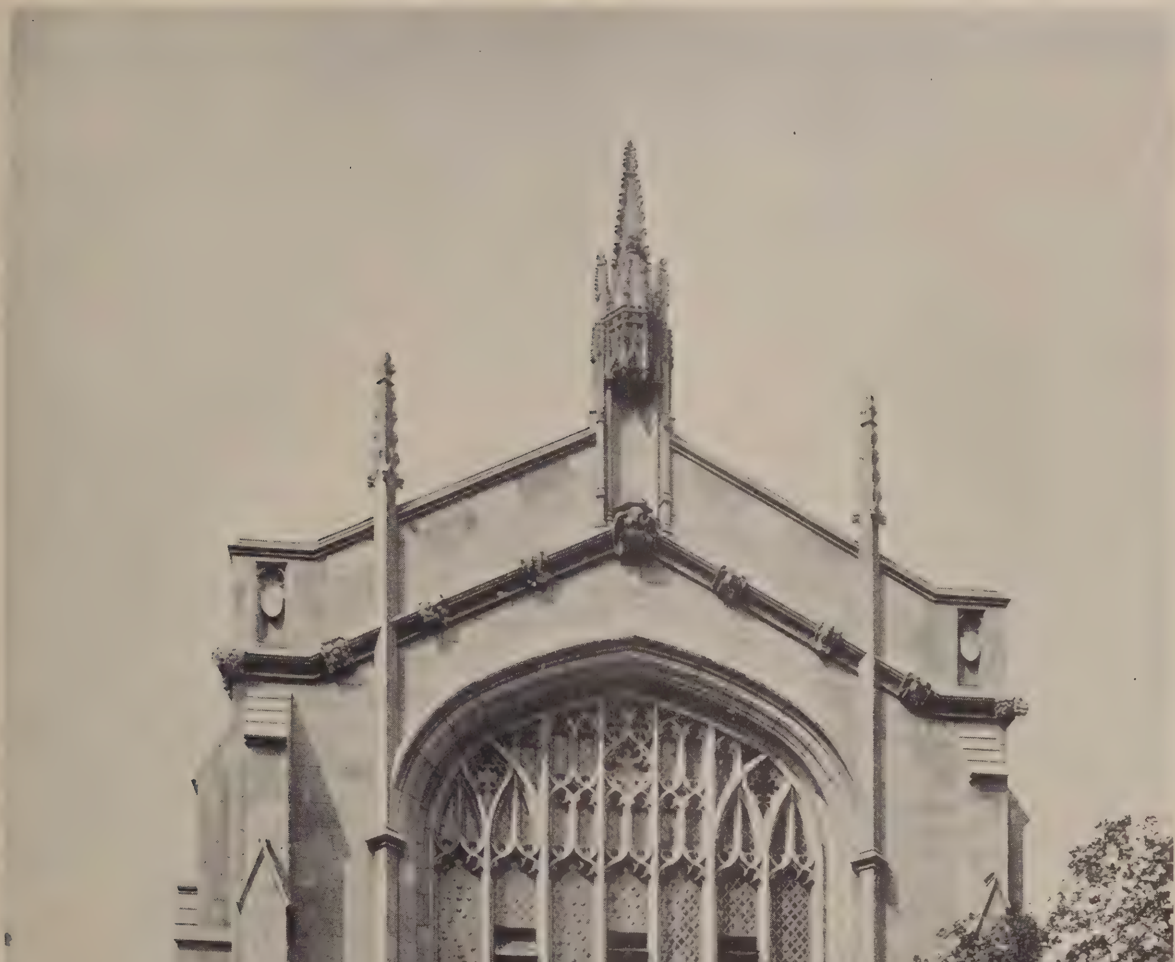
ST. DOMINIC'S CHURCH, SAN FRANCISCO
BEEZER BROTHERS, ARCHITECTS



PLAN: ST. DOMINIC'S CHURCH, SAN FRANCISCO
BEEZER BROTHERS, ARCHITECTS



ST. DOMINIC'S CHURCH, SAN FRANCISCO
BEEZER BROTHERS, ARCHITECTS

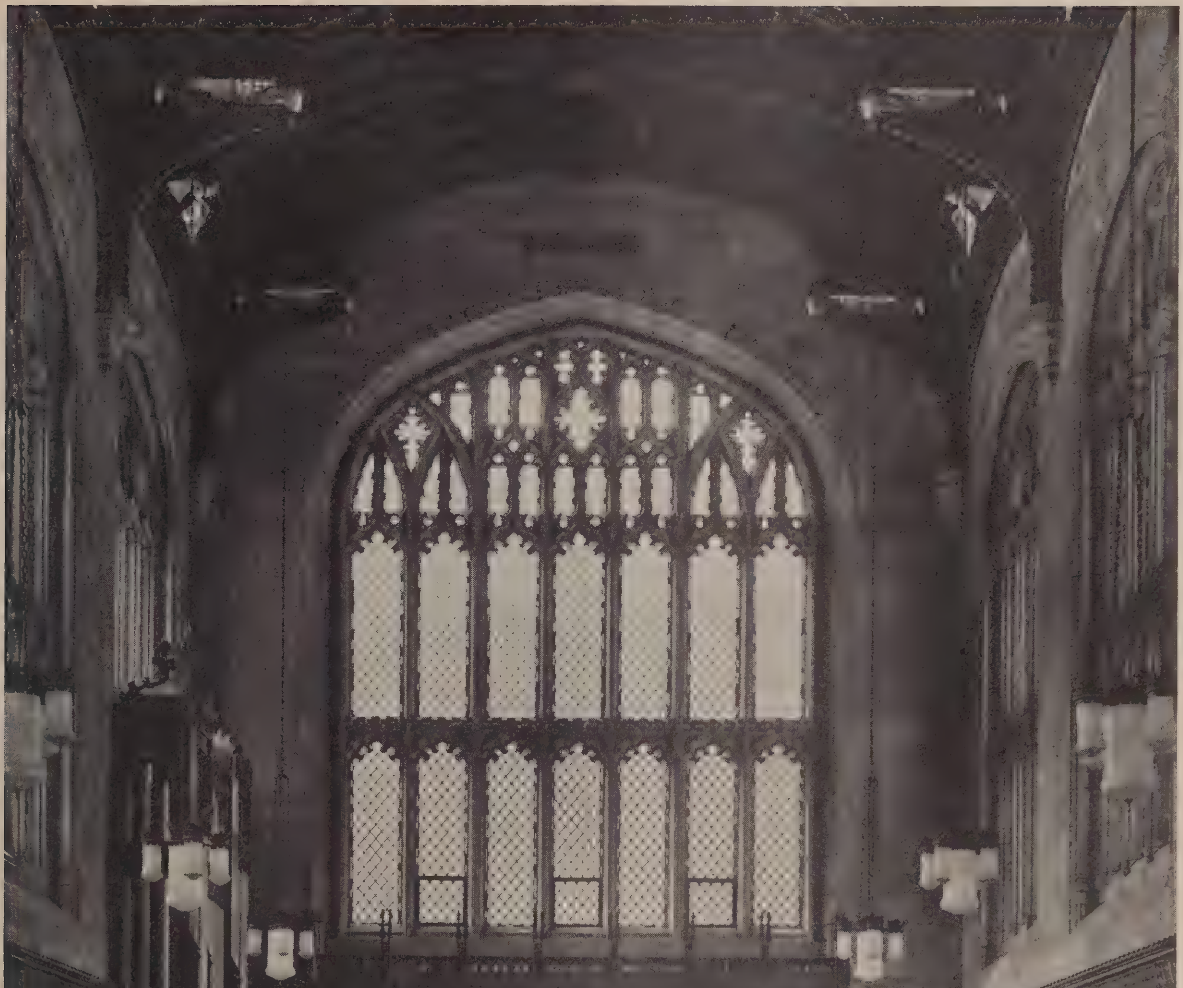


JOSEPH BOND CHAPEL, UNIVERSITY OF CHICAGO
COOLIDGE & HODGDON, ARCHITECTS

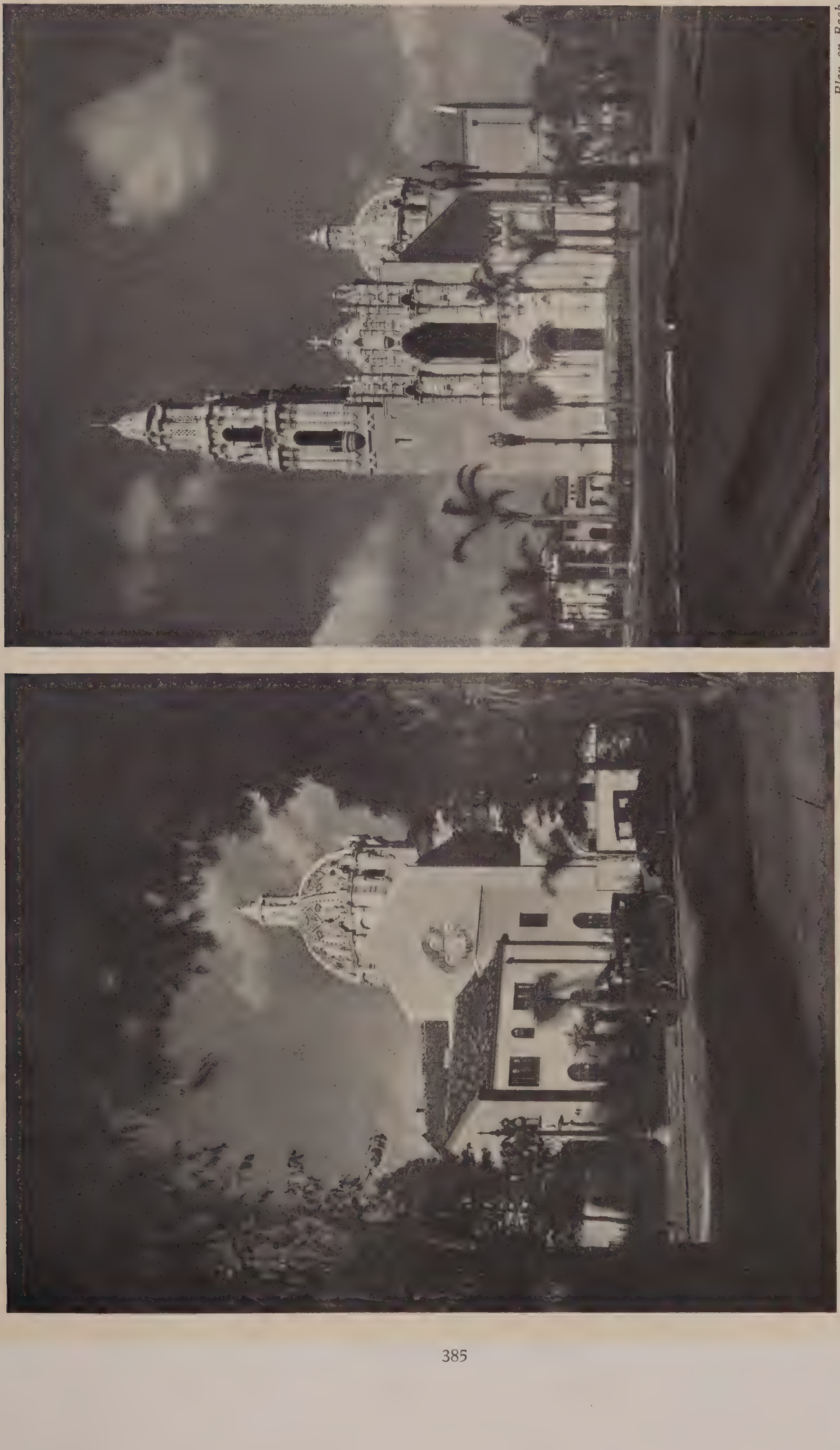
COST AND CONSTRUCTION DATA

Year of Completion: 1926.
Type of Construction: Fireproof.
Exterior Walls: Stone.
Roof: Timber and tile.
Floors: Tile aisles and linoleum.
Interior Materials: Stone, oak paneling.

Heating: Hot blast.
Ventilation: Mechanical.
Cubage of Building: 135,500 feet.
Cubic Foot Cost: $1.24.
Total Cost of Building: $168,318, including furniture and organ.

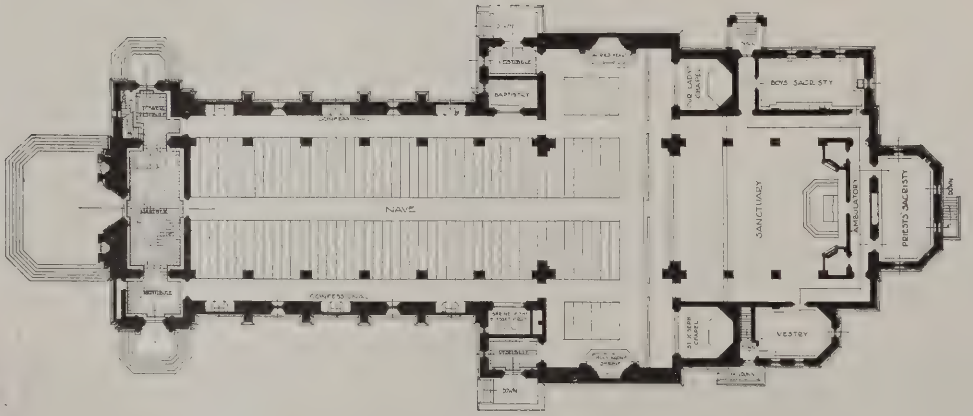


INTERIOR. JOSEPH BOND CHAPEL, UNIVERSITY OF CHICAGO
COOLIDGE & HODGDON, ARCHITECTS



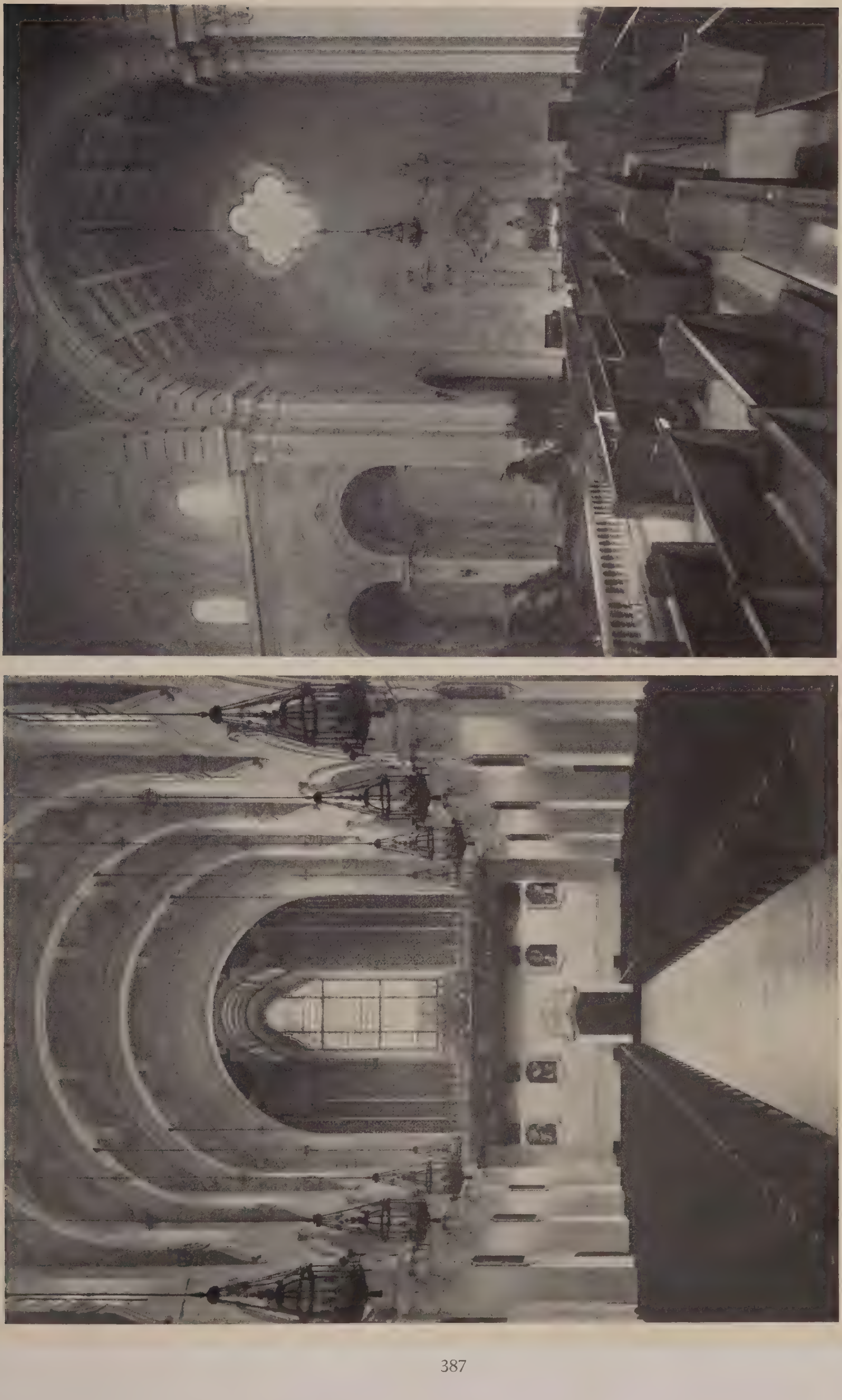
Plan on Back

ST. VINCENT'S CHURCH, LOS ANGELES
A. C. MARTIN, ARCHITECT



GROUND FLOOR

PLAN: ST. VINCENT'S CHURCH, LOS ANGELES
ALBERT C. MARTIN, ARCHITECT



ST. VINCENT'S CHURCH, LOS ANGELES
A. C. MARTIN, ARCHITECT

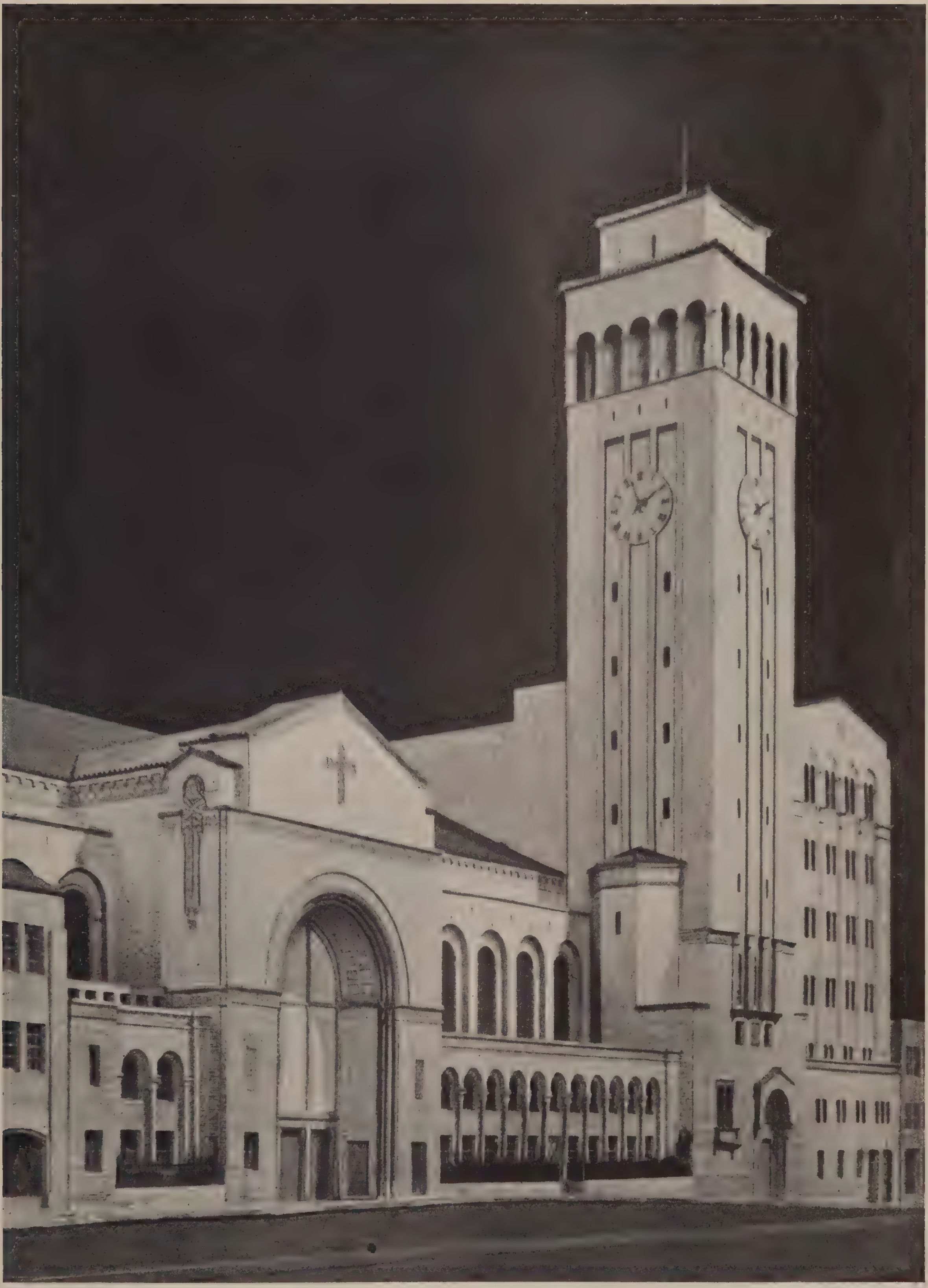
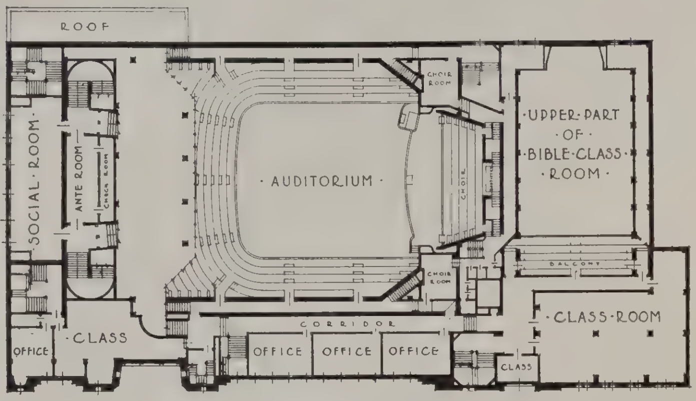


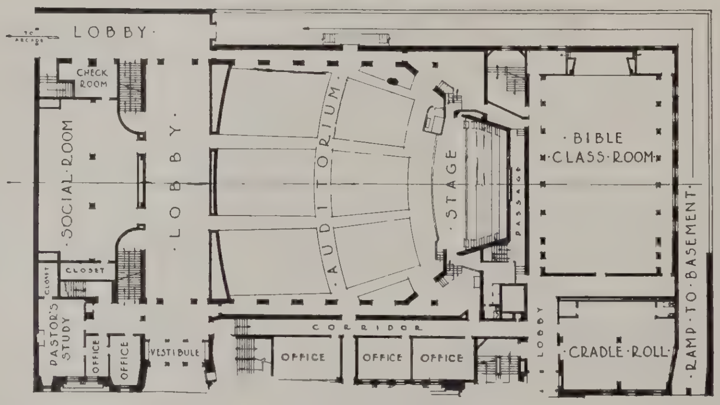
Photo F. C. Brenza

Plans on Back

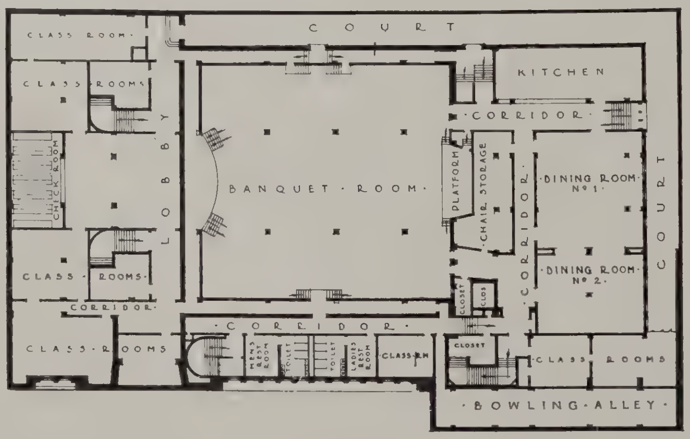
EUCLID AVENUE BAPTIST CHURCH, CLEVELAND
WALKER & WEEKS, ARCHITECTS



MEZZANINE



FIRST FLOOR



BASEMENT

PLANS: EUCLID AVENUE BAPTIST CHURCH, CLEVELAND
WALKER & WEEKS, ARCHITECTS

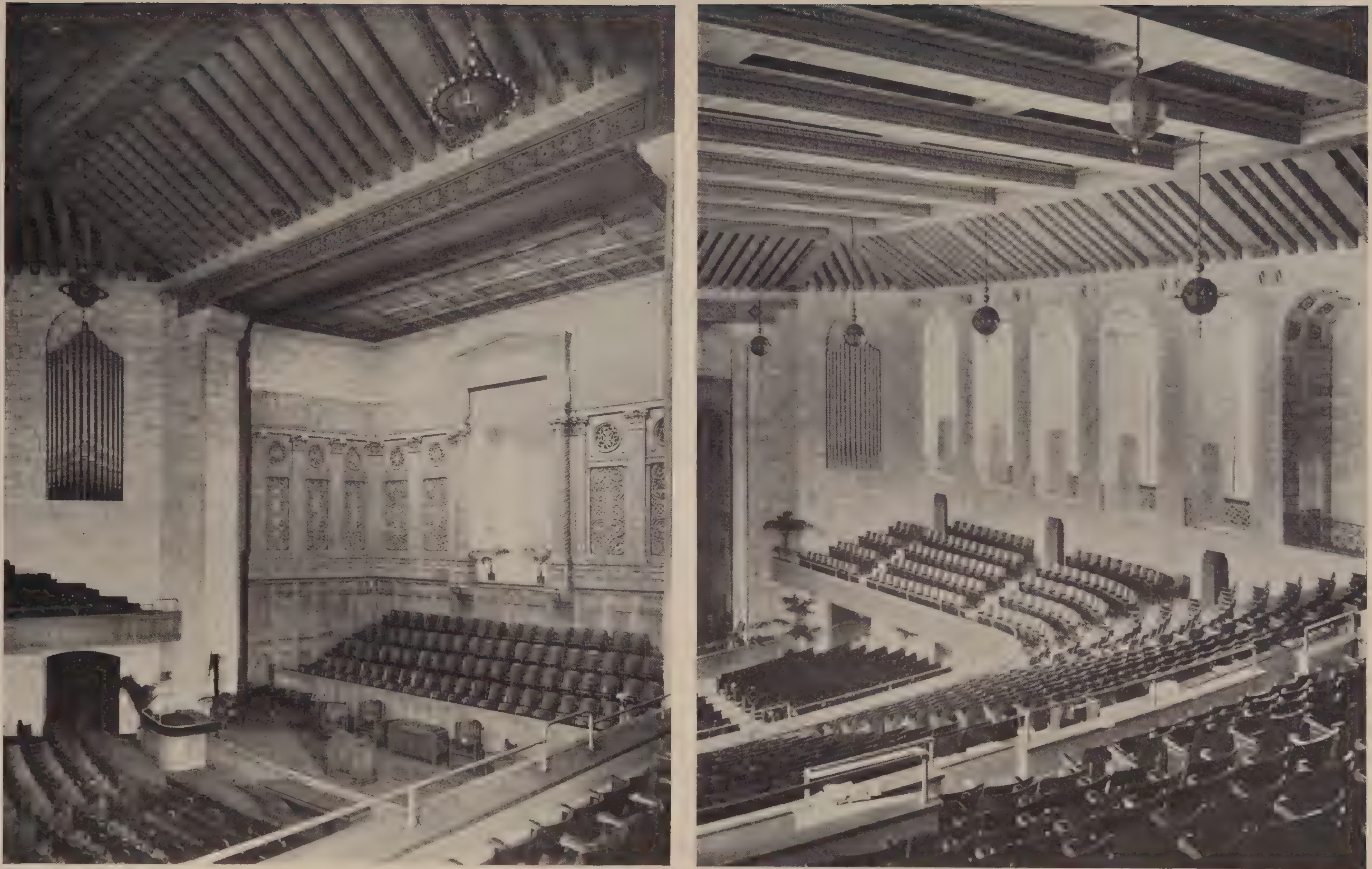


Photo. Ernst Studio

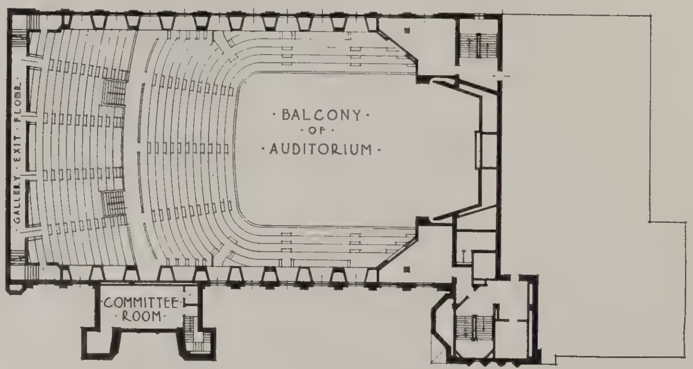
Photo. F. C. Brenza

Plans on Back

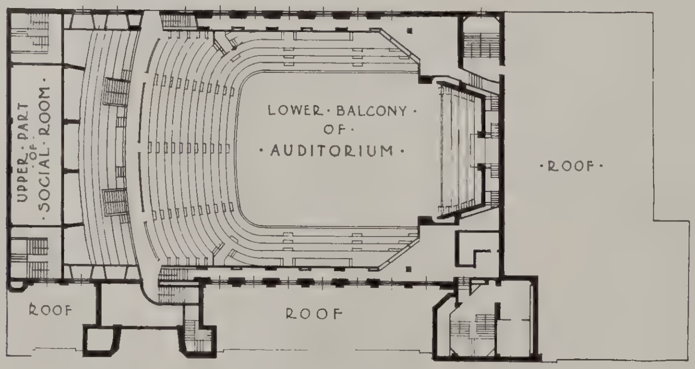
EUCLID AVENUE BAPTIST CHURCH, CLEVELAND
WALKER & WEEKS, ARCHITECTS

CONSTRUCTION DATA

Date of Completion: Only partially completed.
Type of Construction: Steel frame, concrete joists.
Exterior Materials: Terra cotta.
Roof: Tile.
Floors: Cement.
Windows: Metal and wood.
Interior Materials: Imitation stone and plaster walls.
Heating: Vacuum system.
Ventilation: Typical temperature control.

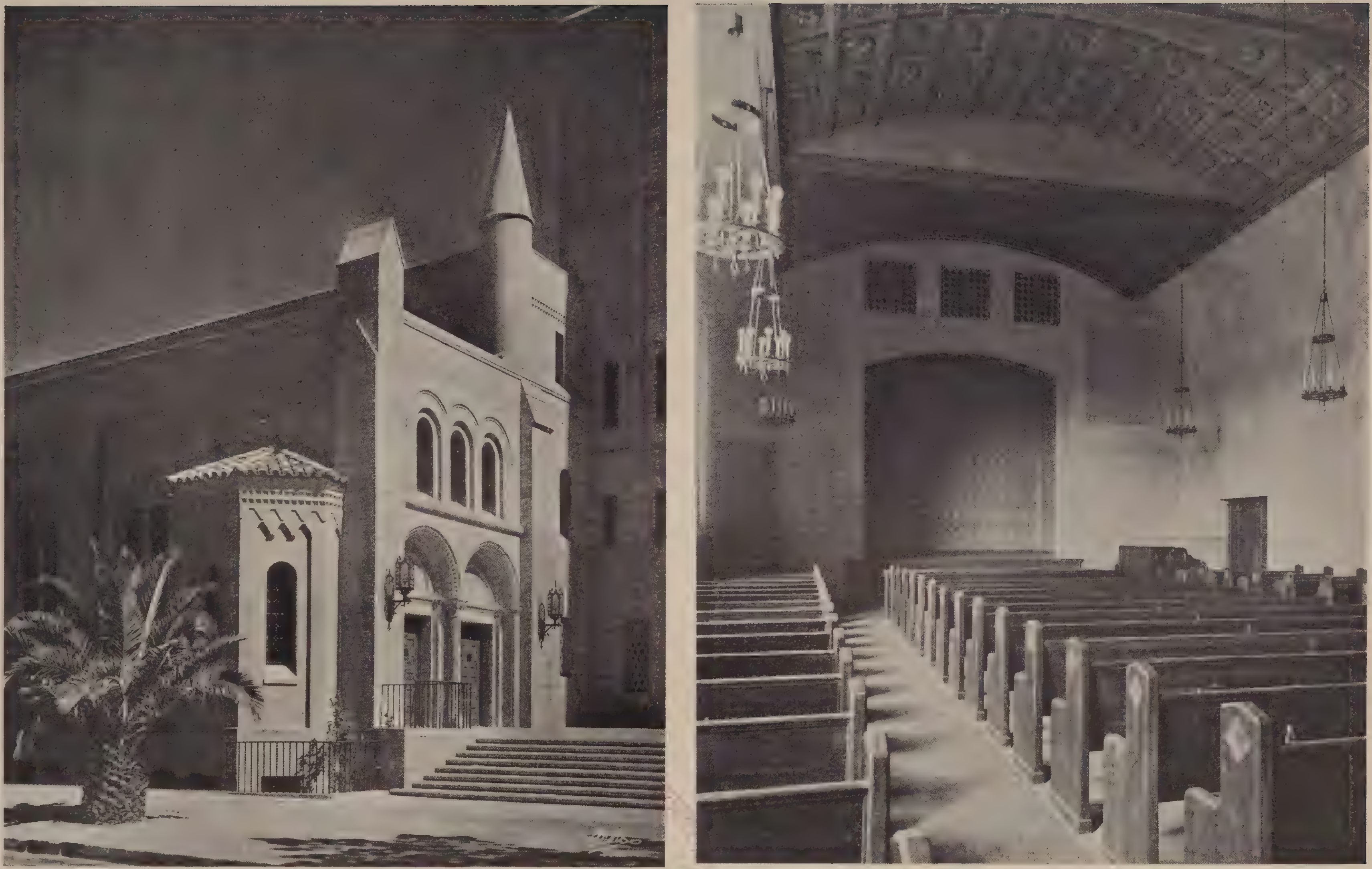


THIRD FLOOR


UPPER PART OF · SOCIAL · ROOM ·
LOWER · BALCONY · OF · AUDITORIUM ·
· ROOF ·
ROOF
ROOF

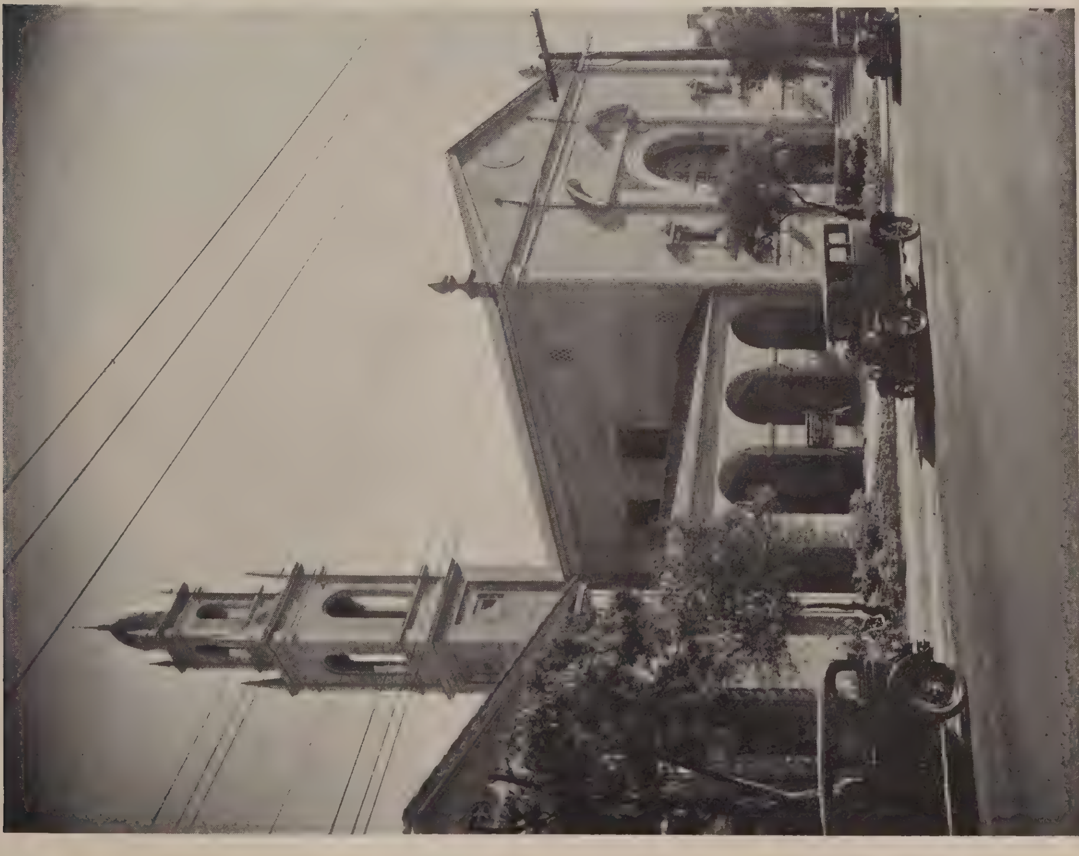
SECOND FLOOR

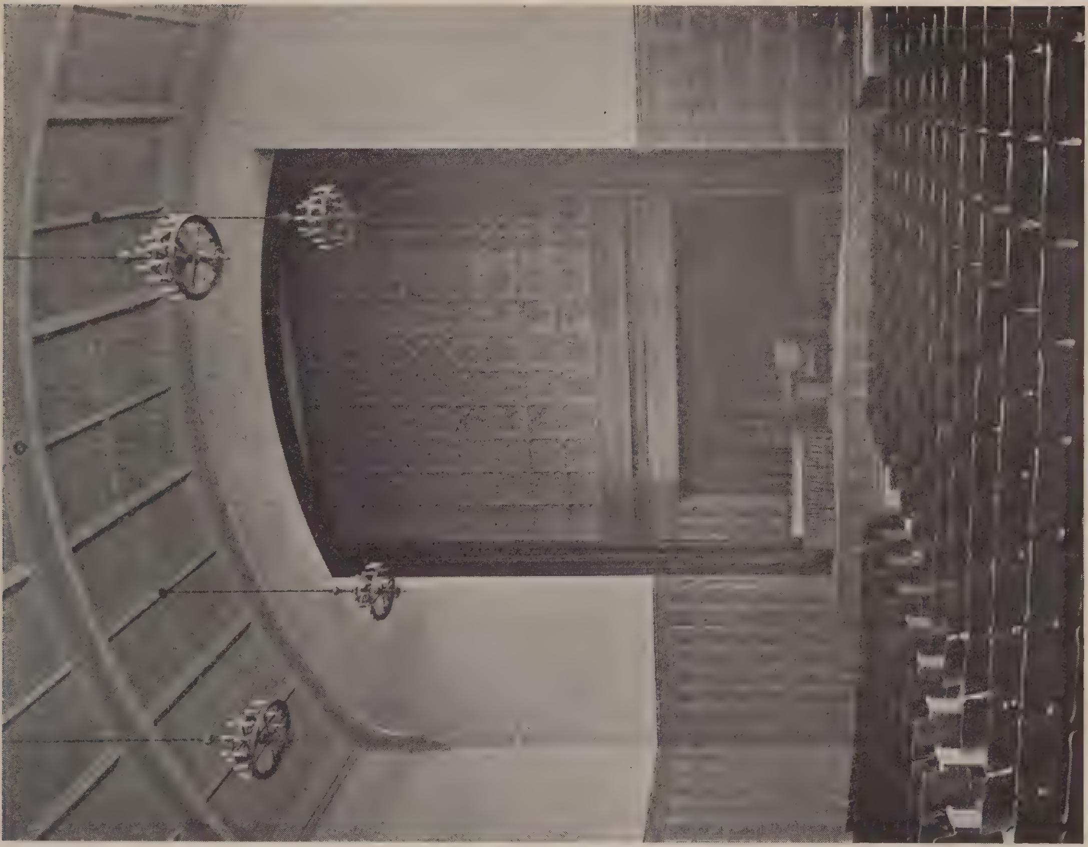
PLANS: EUCLID AVENUE BAPTIST CHURCH, CLEVELAND
WALKER & WEEKS, ARCHITECTS



Photos. Mott Studios

FIRST BAPTIST CHURCH, LOS ANGELES
ALLISON & ALLISON, ARCHITECTS

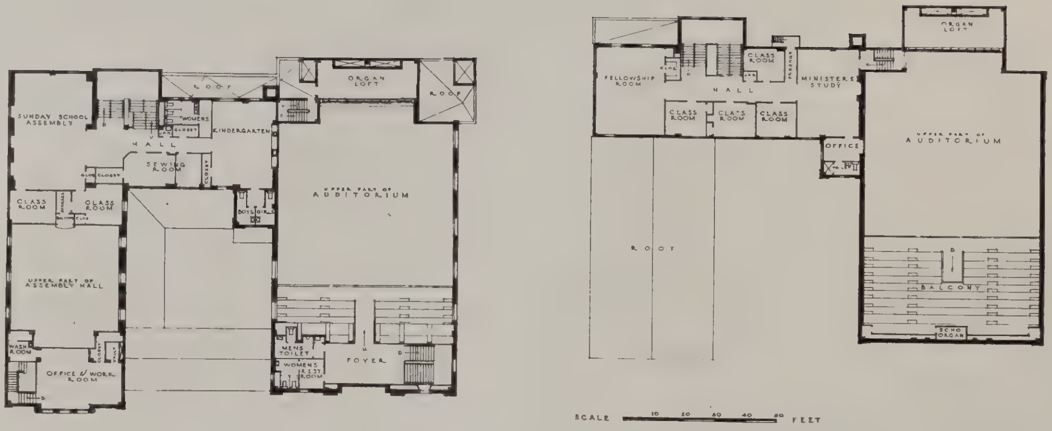




Photos, Mott Studios

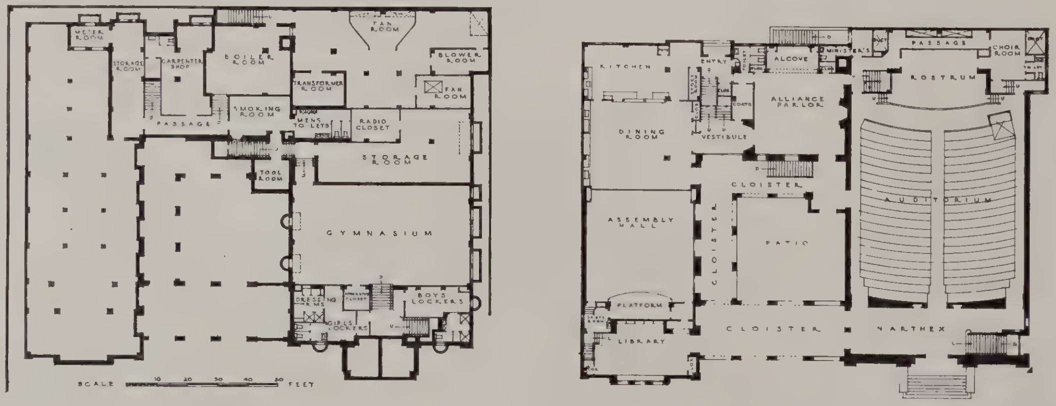
Plans on Back

FIRST UNITARIAN CHURCH, LOS ANGELES
ALLISON & ALLISON, ARCHITECTS



SECOND FLOOR

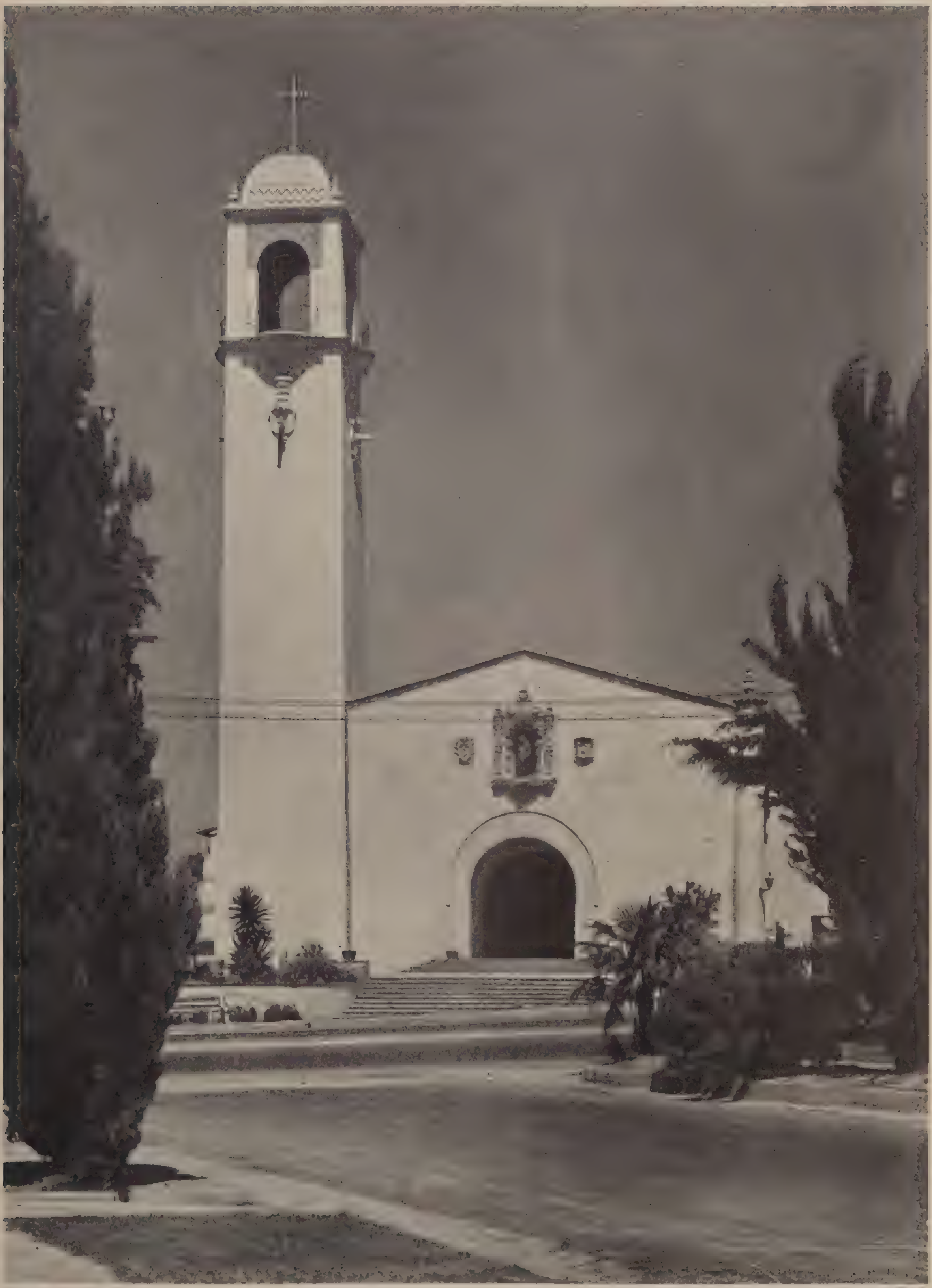
THIRD FLOOR



BASEMENT

FIRST FLOOR

PLANS: FIRST UNITARIAN CHURCH, LOS ANGELES
ALLISON & ALLISON, ARCHITECTS



Photos. Padilla Co. *Plan on Back*

ST. ELIZABETH'S CHURCH, ALTADENA, CAL.
WALLACE NEFF, ARCHITECT

COST AND CONSTRUCTION DATA

Date of Completion: October, 1927.

Exterior Walls: Stucco with cast stone trim.

Roof: Hand made roof tile, dome covered with blue and yellow glazed Mexican tiles.

Interior Walls: Stucco with cast stone trim.

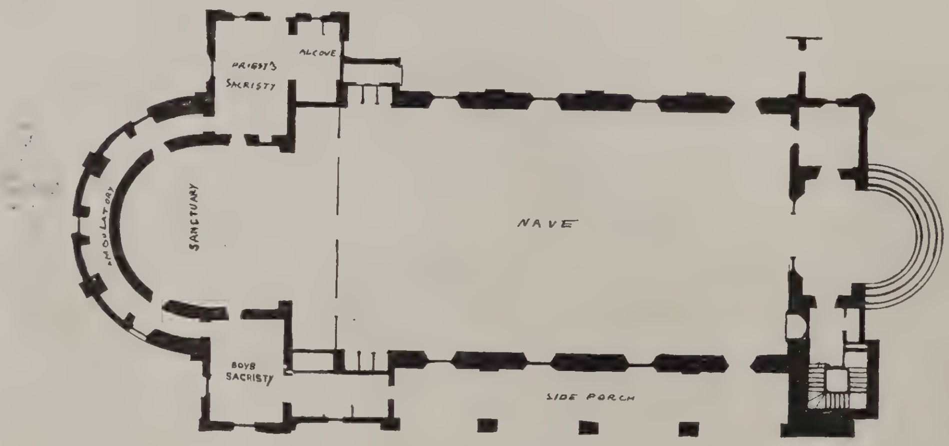
Heating: Gas fired hot air.

Ventilation: By means of an air washer and by Mushroom vents under the pews.

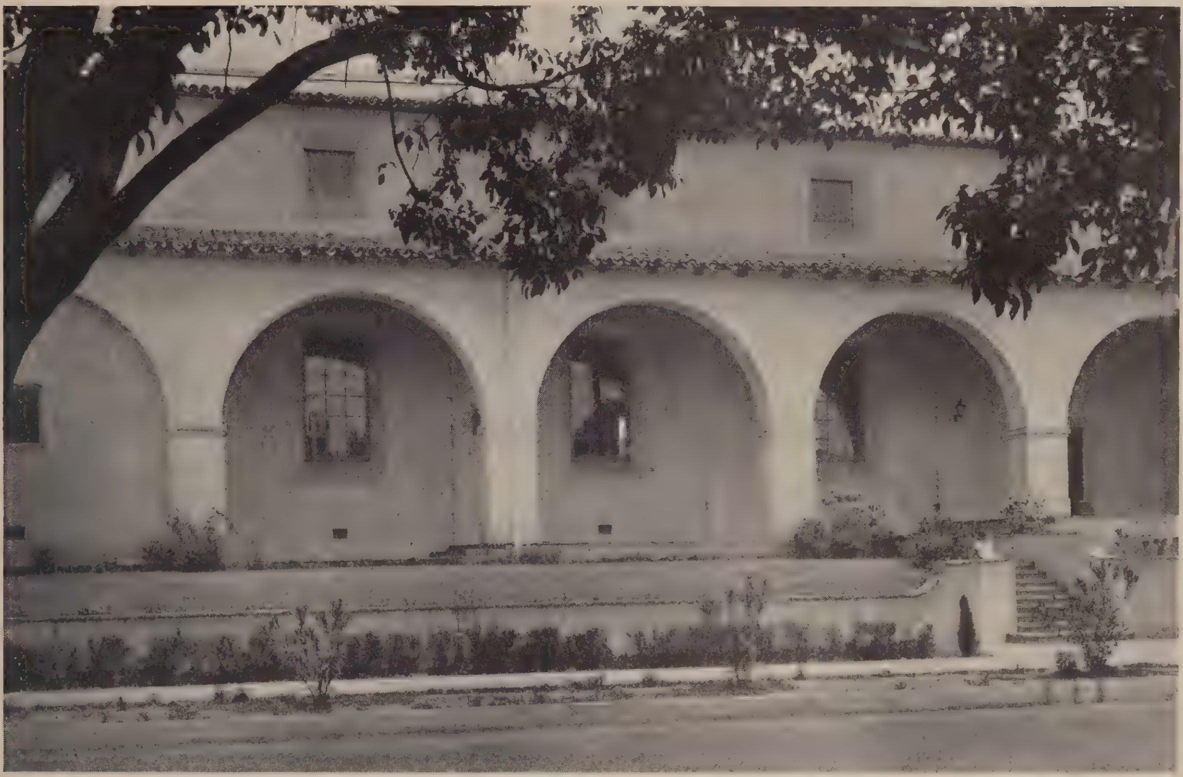
Electrical Equipment: Standard with flood lights back of chancel arch to light the altar.

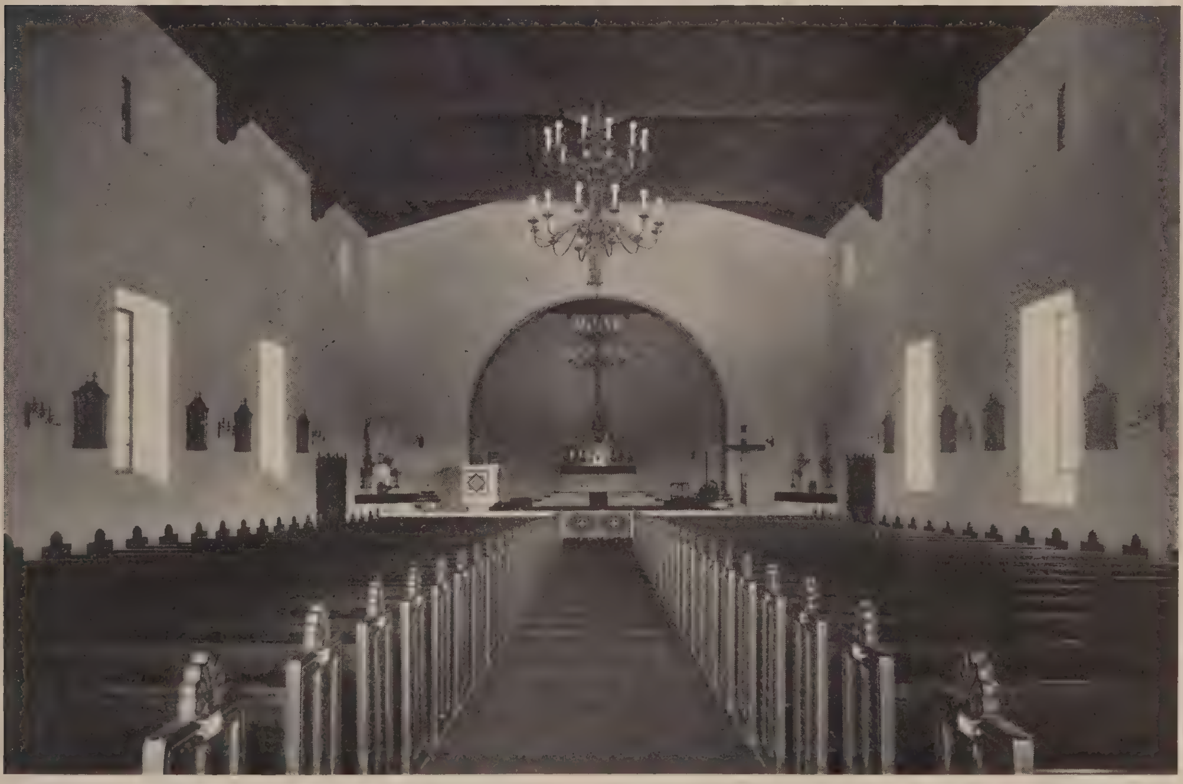
Cubage of Building: 228,066 feet.

Cubic Foot Cost: 29 cents.



PLAN: ST. ELIZABETH'S CHURCH, ALTADENA, CAL.
WALLACE NEFF, ARCHITECT





ST. ELIZABETH'S CHURCH, ALTADENA, CAL.
WALLACE NEFF, ARCHITECT

THE ECCLESIASTICAL WORK OF MAYERS, MURRAY & PHILLIP

BY

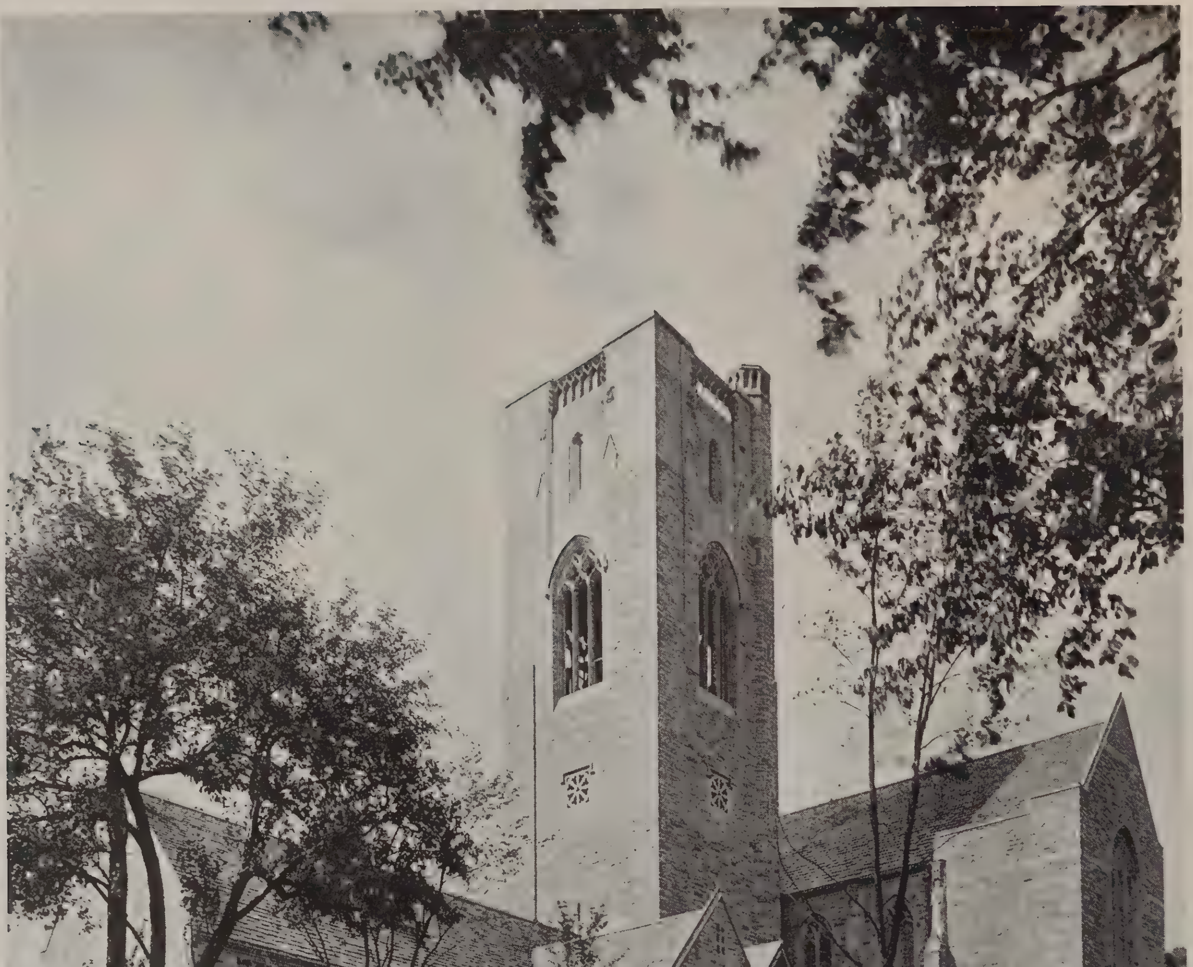
HARRY F. CUNNINGHAM

IN April, 1924, when Bertram Grosvenor Goodhue suddenly died, three young men found themselves faced with a great and unexpected responsibility. Without the slightest warning, the guiding hand was removed from a large office with a great deal of very important work under way. Some of the work was under construction; some of it was in the working drawing stage; some had come into sketch form only; some projects had been scarcely started. Clients immediately began to wonder,—and to inquire,—how their projects were to be carried along. All of this was human and natural enough, but the wonder of the one had to be appeased without delay, and the questions of the other had to be answered at once. In at least one locality where a Goodhue building was under way, the local architects lost no time in endeavoring to persuade the interested clients that the work could properly be carried forward only in their hands. One other project that was in the final sketch stage was literally stolen overnight, by an architect with more "pull" than courtesy. In order that clients might be satisfied, their fears allayed, their confidence reëstablished, it was necessary to immediately effect an organization capable of carrying on the work without interruption, exactly where the master had left off. This was the first and more pressing half of the obligation that three men immediately assumed.

Laurie Mayers had handled the "business end" of the Goodhue office for a number of years. Among other gifts he possesses in a marked degree a faculty for organizing. Oscar Murray and Hardie Phillip had been Mr. Goodhue's principal designers for a long time. They had worked so long and so intimately with him, and so thoroughly had they absorbed his fine philosophy, that they unconsciously thought much as he did; they knew instinctively the things that were "fit" according to the Goodhue sense of the fitness of things. It might be said that they had come to be, in many ways, two more heads and hearts and two more pairs of hands that perfectly supplemented Goodhue's completeness. It was natural and inevitable that these three combine their talents and their activities as the "Goodhue Associates" to carry on the Goodhue work. Faithfully and thoughtfully they carried along the things that were under way, and nobody without reference to the dates on drawings could ever tell just where and when the direction of the work that was under way in April of 1924 changed hands as the result of Goodhue's death.

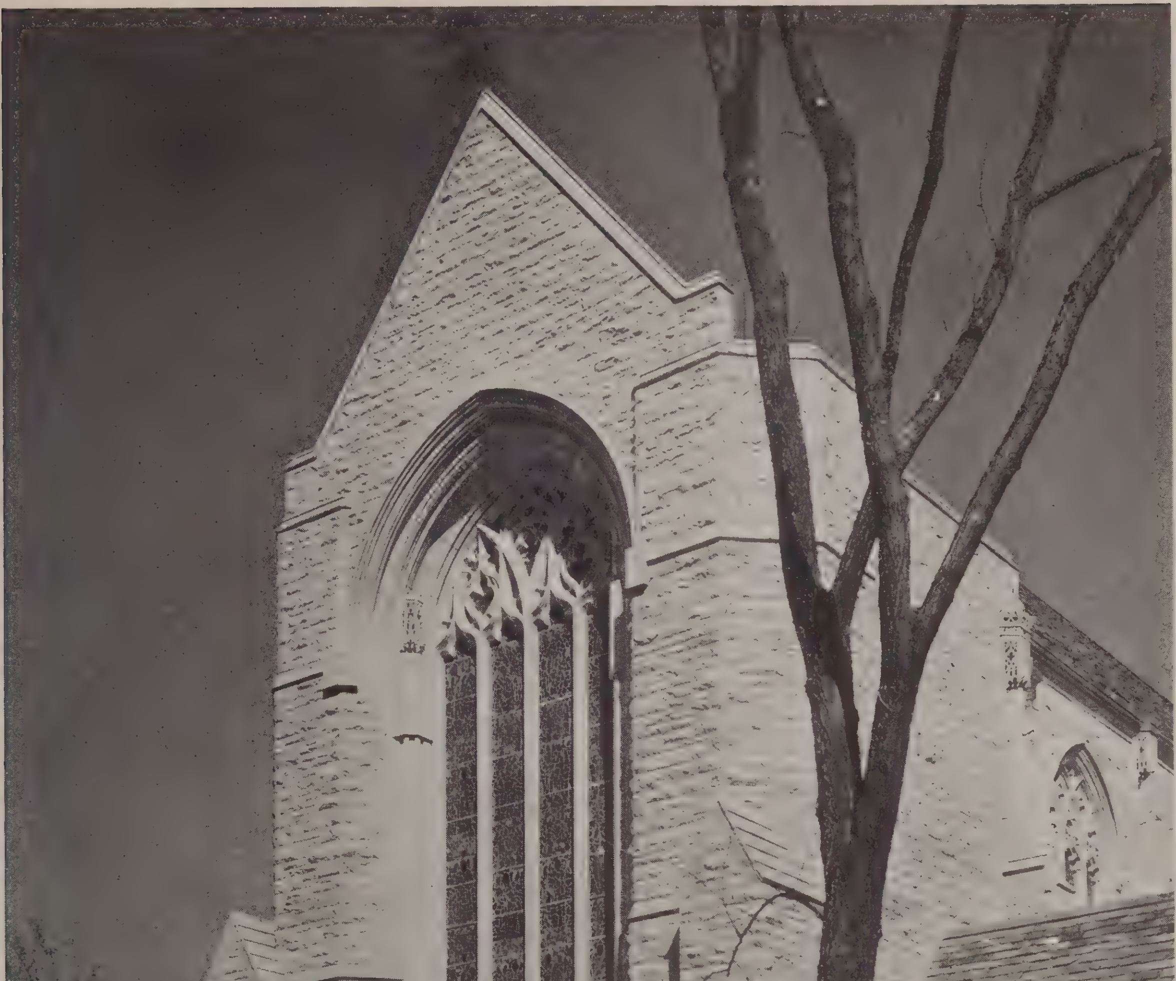
It so happened that none of the important ecclesiastical projects in the office at the time was beyond the sketch stage when the captain's hand left the wheel and the quartermaster's had to take it over. The Nebraska Capitol was under construction, and the Los Angeles Library was ready to begin building. These buildings were partly designed and partly detailed. On these two buildings the fine collaboration that Lee Lawrie had always given Goodhue continued uninterrupted and continues still as an inspiration to those who are privileged to enjoy that fine collaboration. The chapel for the University of Chicago was at that point reached by all projects at one time or another,—it had to be done over, cut in size and cost, changed in scheme and detail. The Epworth Euclid Methodist Church in Cleveland (on which Messrs. Walker & Weeks were associated) was in that happy stage at which it became necessary to make a magnificent preliminary sketch that captivated everyone's imagination, conformed to the definite limits of a budget that would really build about one-third of it if carefully stretched. This building, as now completed, has the simplicity and directness, and exhibits the originality of detail that were fundamental parts of the Goodhue philosophy. One believes that Goodhue would have approved of it; it is done in the Goodhue manner. But it is not in any sense nor in any part a slavish copy of Goodhue forms, motifs or detail. It is one of the two or three links between the two halves of the obligation that fell upon the Mayers, Murray & Phillip shoulders in April of 1924.

When these three men were able to stop and think and take stock as it were, they realized that beyond the great responsibility of carrying on the Goodhue work as they believed he might have wished it carried on, there was the perhaps greater responsibility of establishing, through such new work as might come to them, what one might call an architectural personality of their own. They were not satisfied,—as so many men might have been,—to draw on the office files for schemes, elements and details to copy. They determined to finish the Goodhue work faithfully and carefully as they were sure the master would have finished it, and they determined at the same time, to endeavor to express through their own work, the honest philosophy that they had developed for themselves. Naturally enough, this Mayers, Murray & Phillip philosophy would be reminiscent of the great teacher under whom they had studied and with whom they had worked



Photos. P. A. Nyholm

CHRIST CHURCH, CRANBROOK, MICH.
MAYERS, MURRAY & PHILLIP, ARCHITECTS



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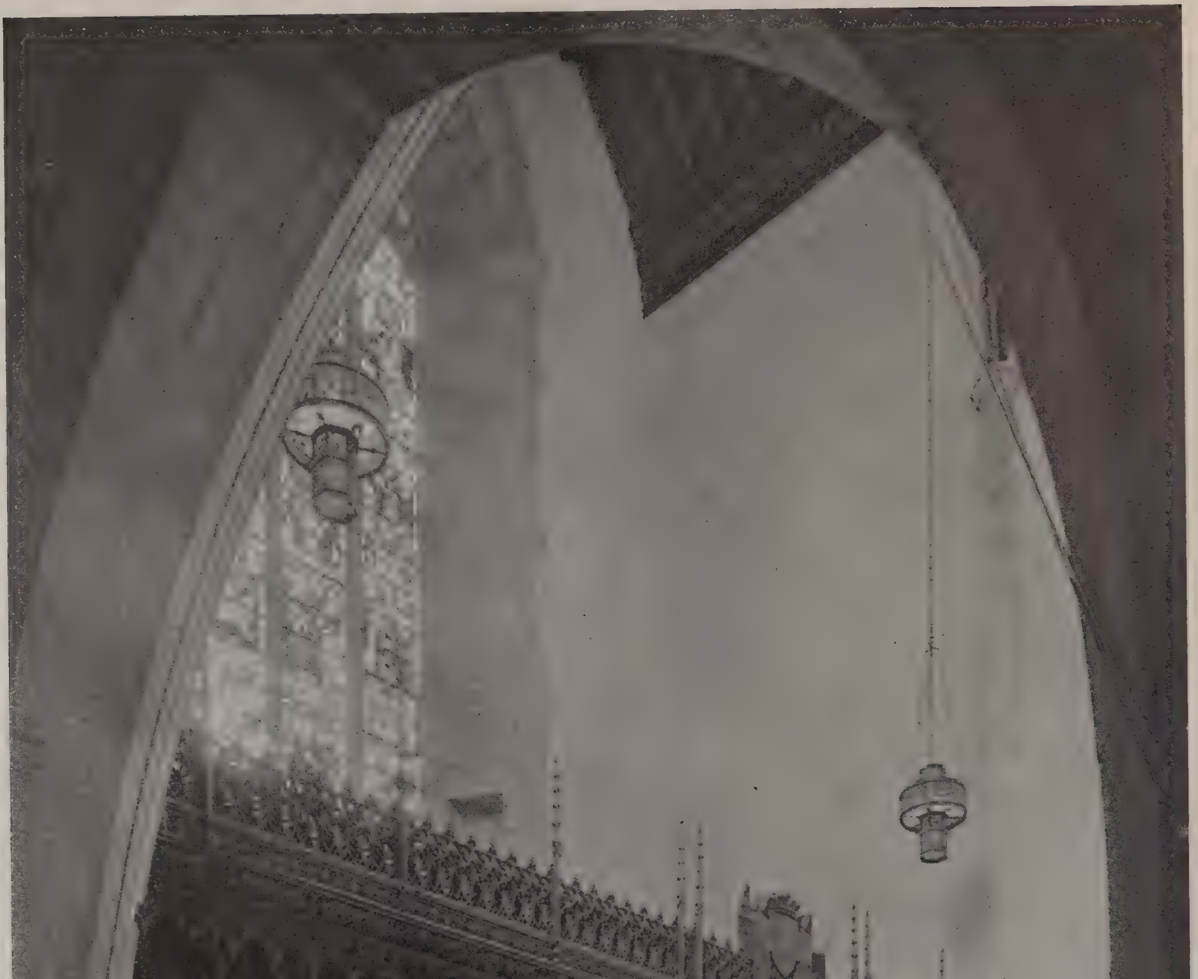
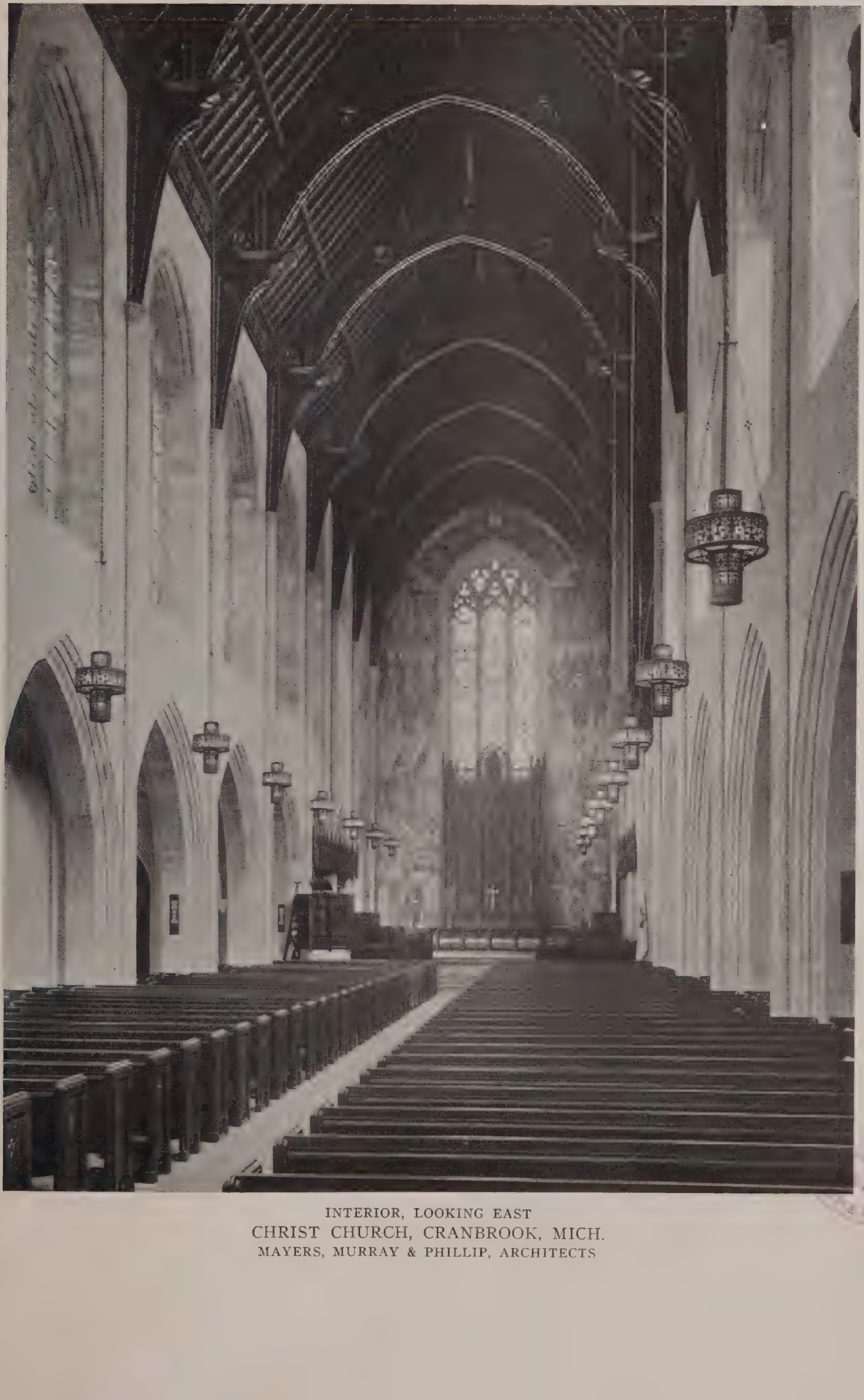
WEST FRONT
CHRIST CHURCH, CRANBROOK, MICH.
MAYERS, MURRAY & PHILLIP, ARCHITECTS



DETAIL OF NARTHEX SCREEN
CHRIST CHURCH, CRANBROOK, MICH.
MAYERS, MURRAY & PHILLIP, ARCHITECTS



INTERIOR, LOOKING EAST
CHRIST CHURCH, CRANBROOK, MICH.
MAYERS, MURRAY & PHILLIP, ARCHITECTS

enthusiastically. In speaking of Mr. Goodhue at the 1924 convention of the American Institute of Architects, Mr. Cram said: "All his life he held faithfully to our original contention, which was that the way to do Gothic today was to begin where Gothic left off, and go forward from that point." One might say that Mayers, Murray and Phillip felt that the way to carry on the rich heritage of the Goodhue tradition, was to begin where Goodhue had left off, and go forward from that point. One knows that that is exactly what the master would have had them do. And that is exactly what these three men have been faithfully striving to do. It was not the easiest way, but it was surely the bravest, and the most honest way.

The simple, serious little St. John's at Buffalo, the charming Christ Church at Bronxville, and several other smaller churches built during the past few years, may be said to be steps,—and they are sure steps,—along the pathway toward finding and expressing this "architectural personality" that has found larger and more complete illustration in the Cranbrook Church and the almost completed Church of the Heavenly Rest in New York. Cranbrook is what might be called a "Murray job";—Heavenly Rest is a "Phillip job" in the office slang. Both are true "Mayers, Murray & Phillip jobs." The two designers work together. Neither ever hesitates to shoot the work of the other "full of holes" if need be. Mayers, with his exceptional critical sense, can find enough things wrong with what all have agreed is perfect to discourage nine out of ten industrious pencil pushers, and with this fine critical sense of his he keeps everyone's feet on the ground and a bit of cash in the bank. Each of these buildings is an honest expression of the true Gothic principles of construction suited to modern methods, materials and needs. The office believes,—as Goodhue did of course,—in honest masonry construction. Goodhue said once that his "columns coll" and his "buttresses butt." The Mayers, Murray & Phillip piers and buttresses act just that way too. Their piers and buttresses have no hidden steel skeletons in their architectural closets, and the vaults that the piers and buttresses support and balance are honest.

The church at Cranbrook is unusual in many ways. It may be said to be the center of a most interesting community established by George G. Booth, near Detroit. Mr. Booth began his business life in an architect's office, but presently gave

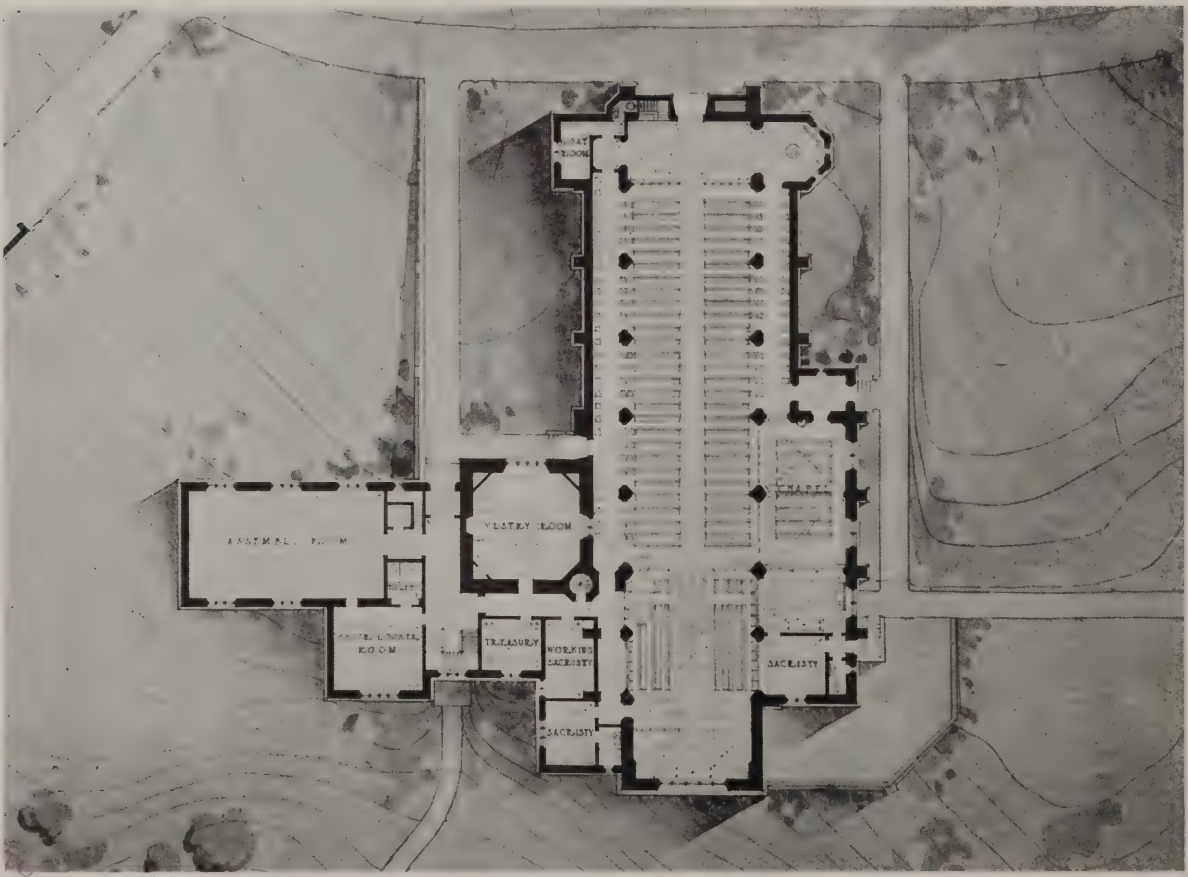


Photo. Peter A. Juley

Plan

Christ Church, Cranbrook, Mich.

Mayers, Murray & Phillip, Architects

up architecture for the equally adventurous,—and much more remunerative,—profession of newspaper publishing. He has a number of children, and his primary idea in starting the Cranbrook community was to provide a pleasant setting for the homes of his own and his children's families and the families of friends of them all. Since its beginning the community has grown to include two schools,—one for girls and one for boys. And latterly a sort of crafts center has been added,—various shops and studios being provided, wherein accomplished craftsmen may work in ideal surroundings and train others in their work. It is interesting to note in passing that Eliel Saarinen is the "resident architect" and has designed the buildings for the schools. One of Mr. Booth's sons has designed some of the community buildings.

The Cranbrook church is actually two bays longer than the plan shows,—the length having been increased by some 34 feet after the plan shown on page 406 was made. The nave is unusually long in proportion to its width. The effect of the uncommon proportions is one of great size and majesty,—the church looks much larger than it really is. There are sittings for about 800 in the nave and the chapel, the latter seating about 120. There are no galleries, which is quite unusual and very commendable in these days of "more and better seats." There is a most interesting mortuary chapel in the basement. A beautiful detail is the baptismal font which was exhibited at last year's Architectural League exhibition. The font proper is decorated with figures for which Leo Friedlander made the models, and with gorgeous colored marble inlays. The cover is of bronze and colored enamels. I have an idea that those who saw this font at the League exhibition will not soon forget it. A feature of the interior is the fresco decoration of the chancel wall by Miss McEwen, who has a studio in the Cranbrook community.

The Church of the Heavenly Rest and Chapel of the Beloved Disciple at Fifth Avenue and 90th Street, in Manhattan, is distinguished first by having had the most unusual building committee that an architect might hope to work with. It is seldom indeed that an architect has the opportunity to serve a committee with such understanding and imagination as are possessed and manifested by this committee in general and by its secretary, Clarence G. Michalis, in particular. I once heard Mr. Michalis say that when his com-

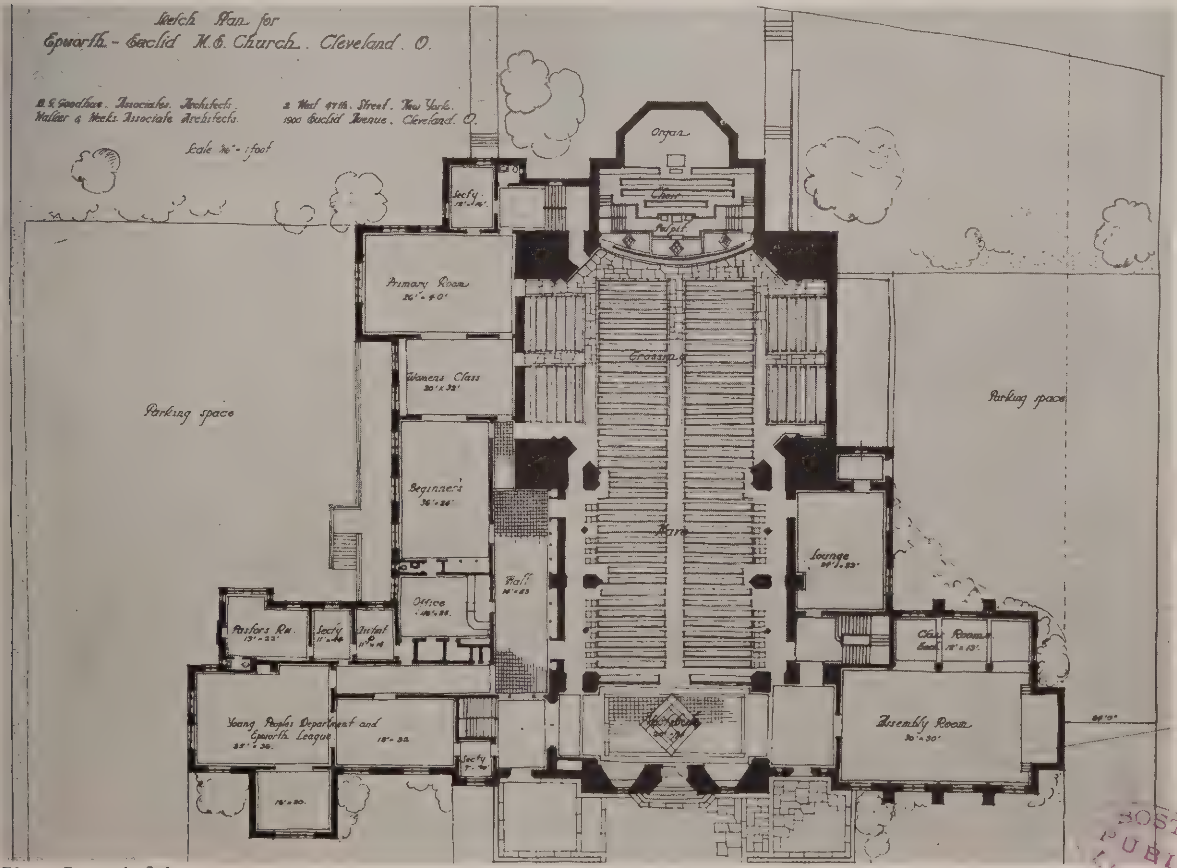


Photo. Peter A. Juley

Plan

Epworth Euclid M. E. Church, Cleveland

Bertram Grosvenor Goodhue Associates, and Walker & Weeks, Architects

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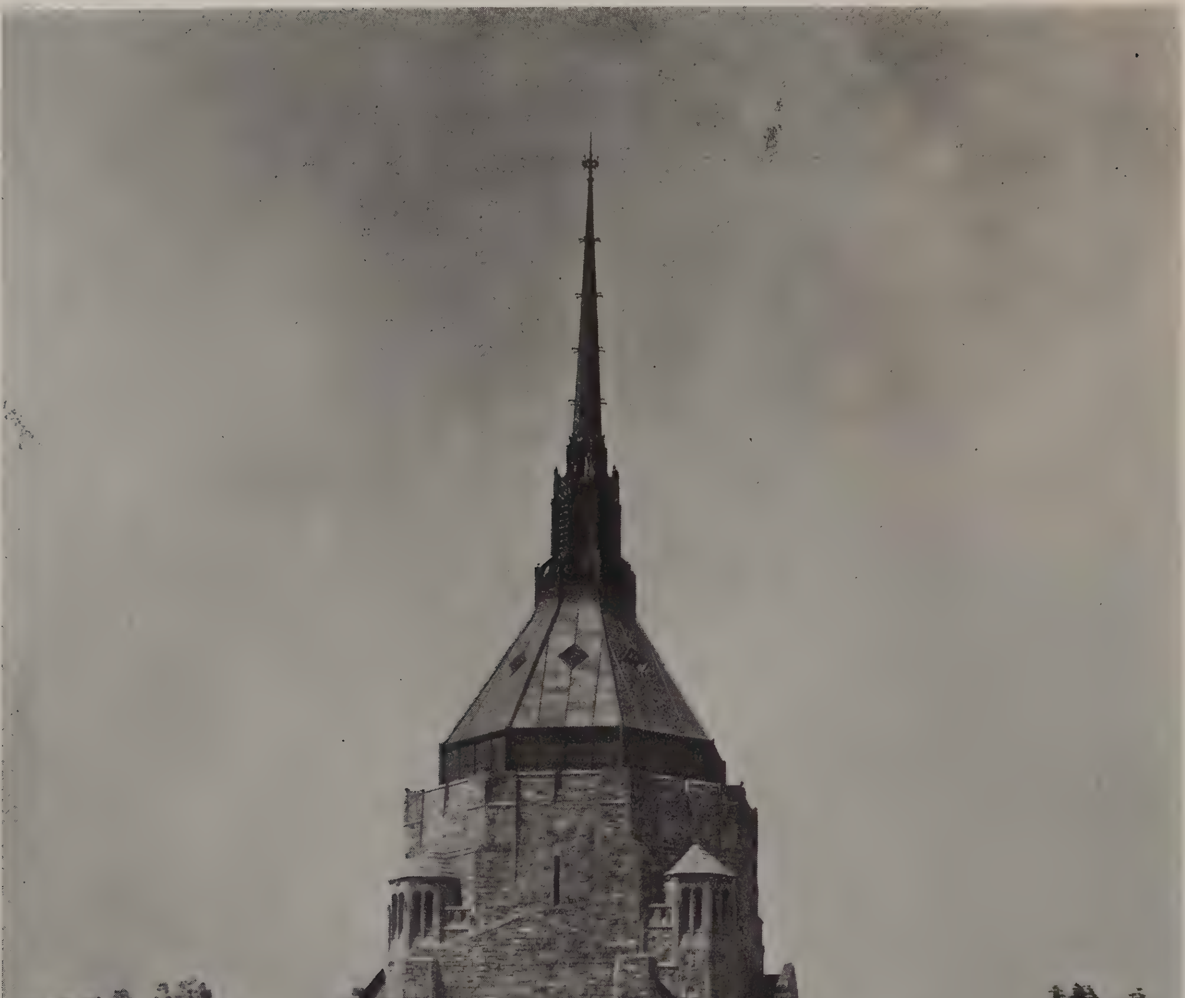

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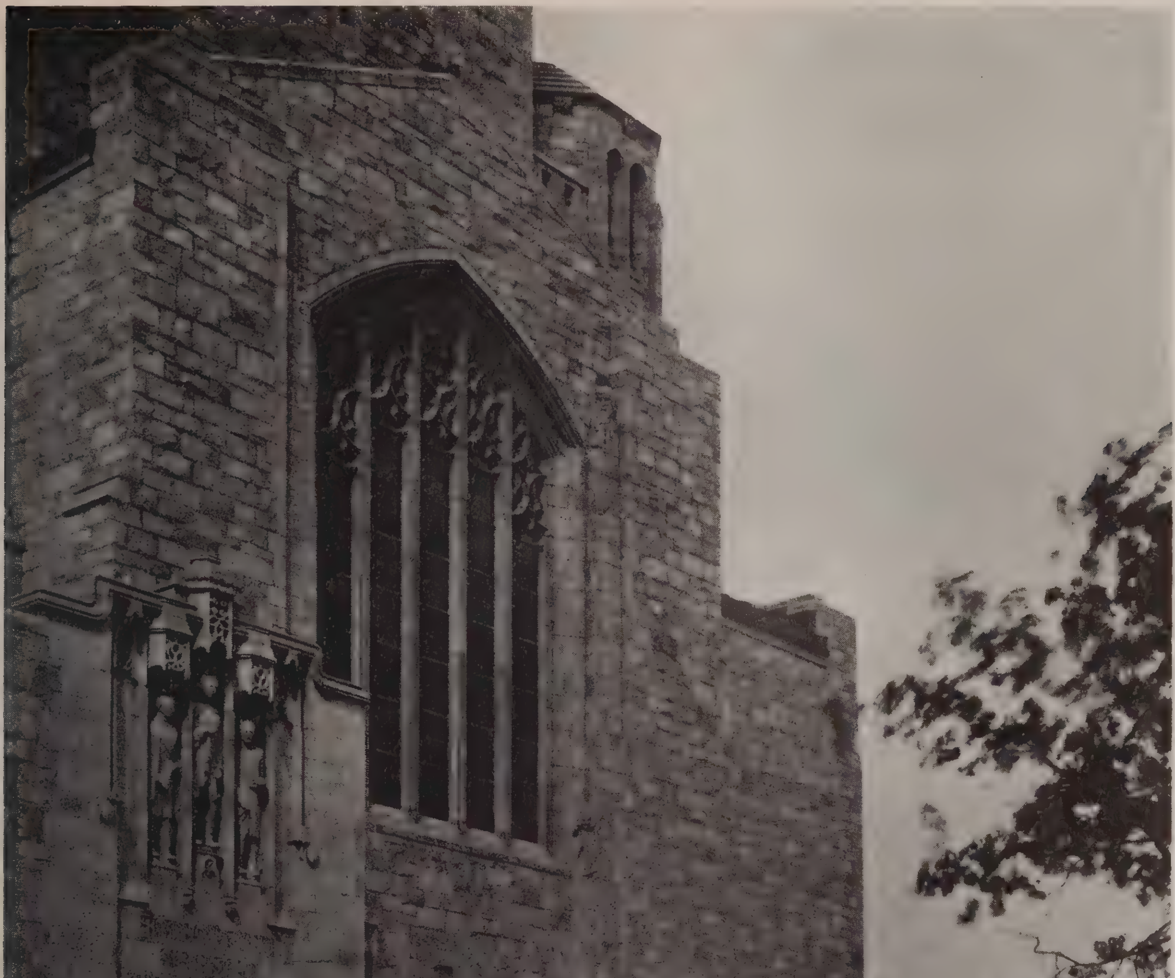
Photos. Tebbs & Knell, Inc.

EAST ELEVATION
EPWORTH EUCLID M. E. CHURCH, CLEVELAND
BERTRAM GROSVENOR GOODHUE ASSOCIATES, AND WALKER & WEEKS, ASSOCIATED, ARCHITECTS



SIDE ENTRANCE

EPWORTH EUCLID M. E. CHURCH, CLEVELAND

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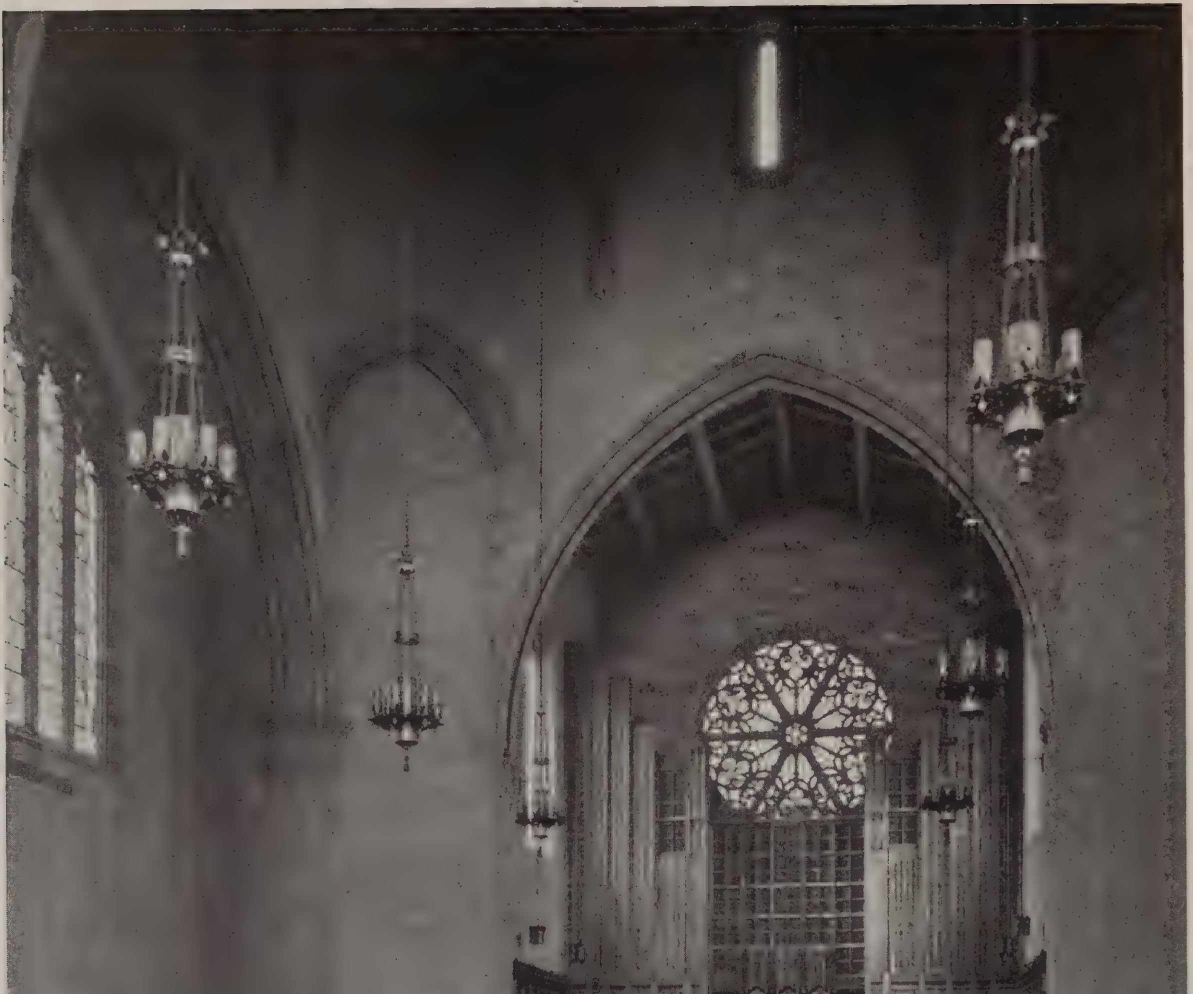
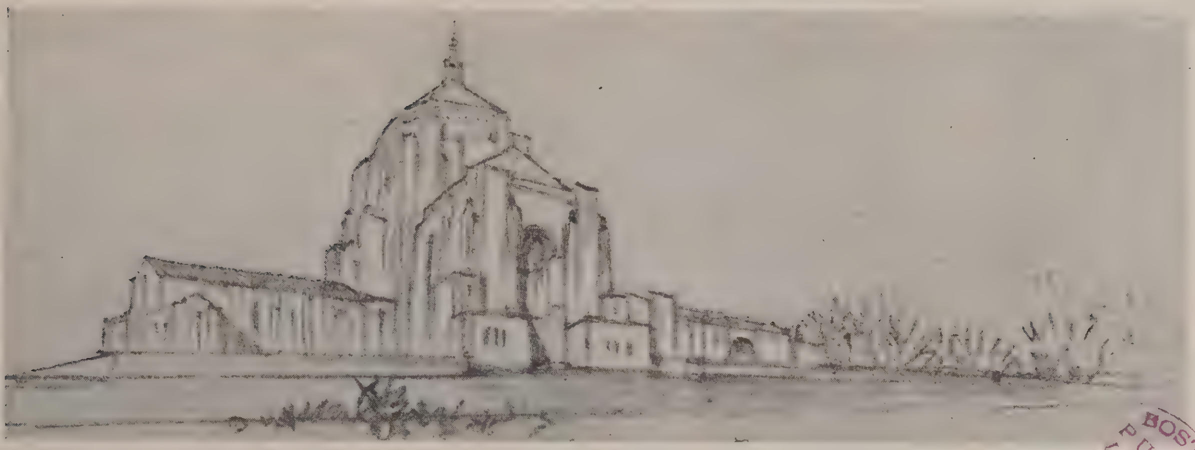


INTERIOR, LOOKING TOWARD CHANCEL

EPWORTH EUCLID M. E. CHURCH, CLEVELAND

BERTRAM GROSVENOR GOODHUE ASSOCIATES, AND WALKER & WEEKS, ASSOCIATED, ARCHITECTS



Perspective

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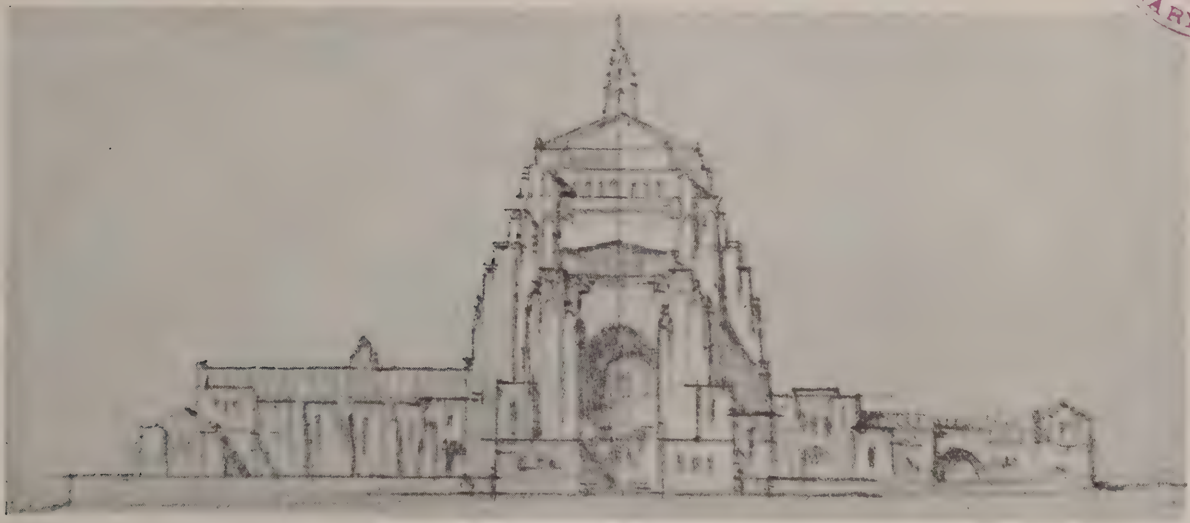

Pencil Studies for a Protestant Church
Drawn by Hardie Phillip
Mayers, Murray & Phillip, Architects

mittee was visiting architects' offices and "sizing up" the profession with a view to selecting a firm to act as architects for the new church, he was particularly attracted to the Mayers, Murray & Phillip office as being the "only one in which he found the architects with their coats off, *working*." This building is to house what were formerly two separate congregations, and therefore the plan had to provide,—in addition to the parish house,—two more or less distinct structures. There is the Church of the Heavenly Rest, and there is also,—with a separate entrance,—the Chapel of the Beloved Disciple. The church seats about 1000 in the nave and gallery. The nave seats are served by five aisles, instead of the usual three. Thus all seats are easy to reach and easy to leave, without disturbing too many of one's neighbors. The height of the building was definitely limited by agreements contained in the deed. Therefore, in order to achieve the desired proportions of the interior, the level of the nave was raised only one step above the Fifth Avenue sidewalk. This gives the added advantage of making it easier for those whose steps are no longer so sure, to enter and leave the church.

The interior is particularly impressive in its proportions and in its great simplicity. It has been a great experience to visit this interior while the dust raised by the workmen was floating about. Dust is generally supposed to be a very unwholesome thing, but its presence in this great, simple nave has lent an air of mystery that it will lose somewhat when the vacuum cleaners have done their work! There is surely something almost spiritual in the glint of sunlight on straying specks of dust. The warm color of the interior is cheerful and comfortable. The nave is perfectly simple,—almost entirely devoid of detail. The chancel is, in contrast with the nave, very rich, with its pierced stone organ screens and its

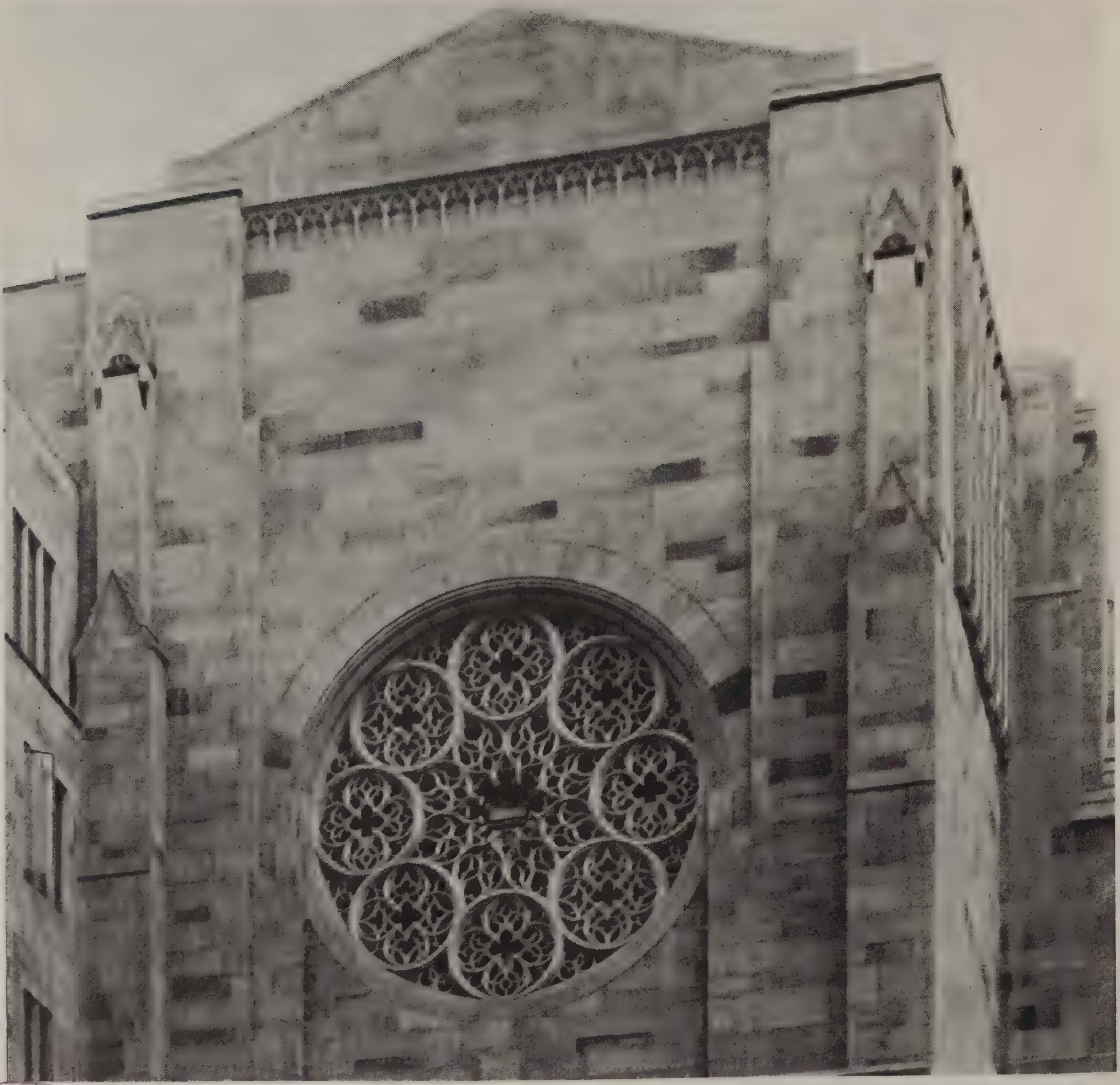

Photo. Albert Rothschild

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ROSE WINDOW IN EAST END
STAINED GLASS BY J. GORDON GUTHRIE

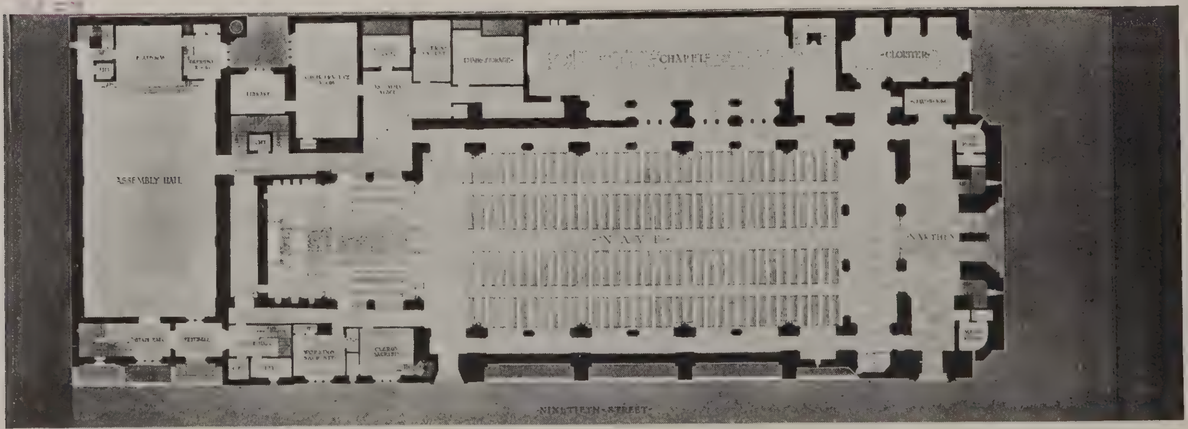

Photo. Peter A. Juley

CHURCH OF THE HEAVENLY REST AND CHAPEL OF THE BELOVED DISCIPLE, NEW YORK
MAYERS, MURRAY & PHILLIP, ARCHITECTS

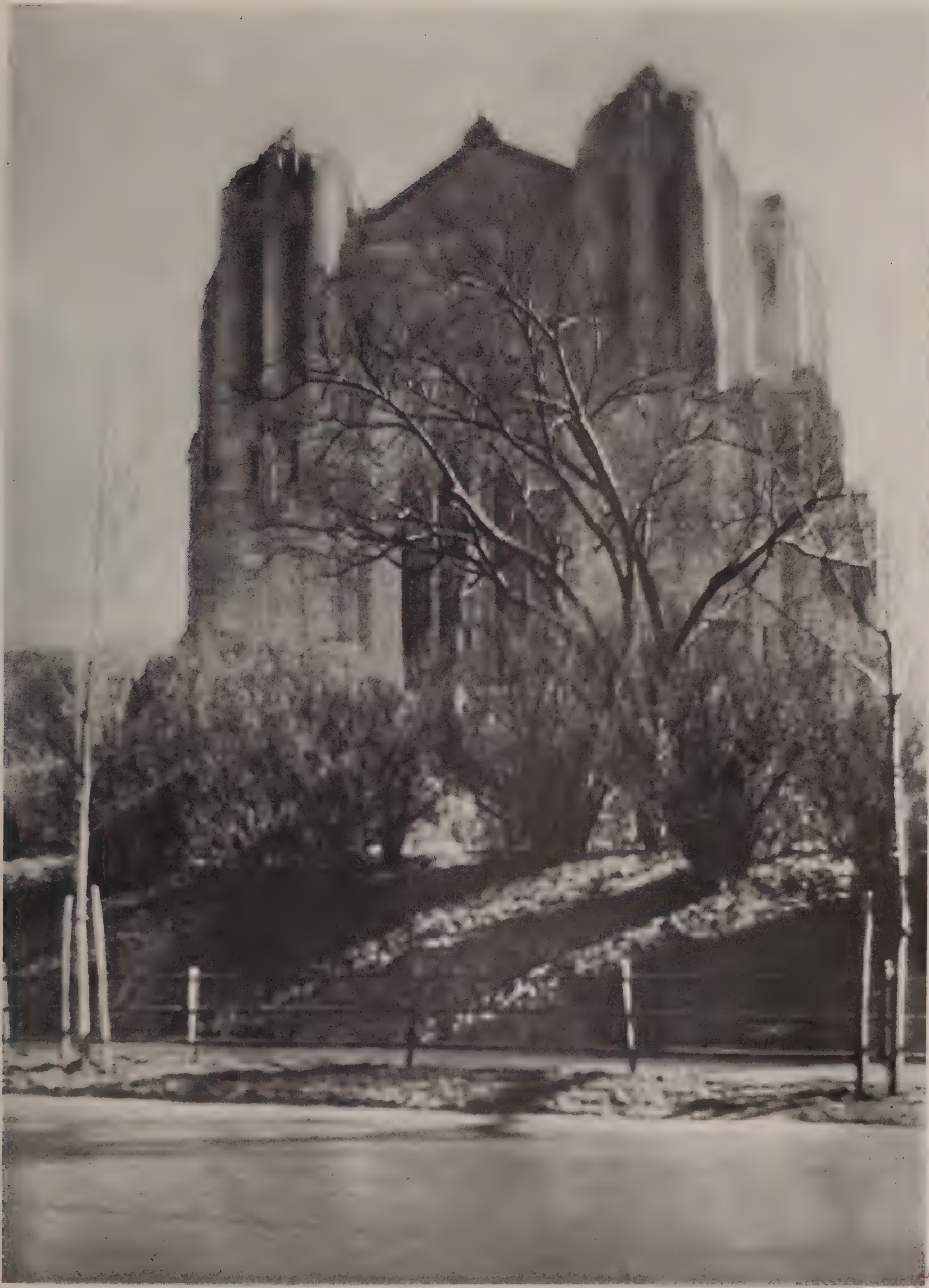

Photo. Hiram Myers

CHURCH OF THE HEAVENLY REST AND CHAPEL OF THE BELOVED DISCIPLE, NEW YORK
AS SEEN IN THE EARLY MORNING FROM CENTRAL PARK
MAYERS, MURRAY & PHILLIP, ARCHITECTS

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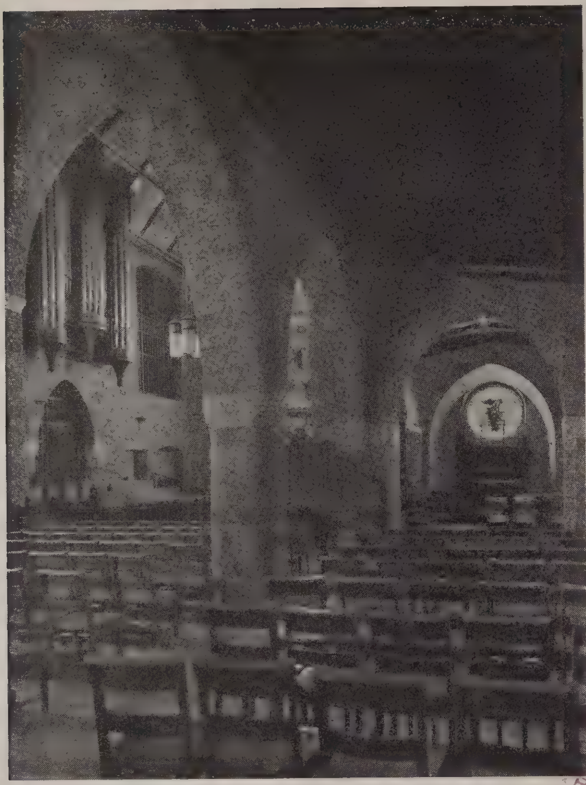
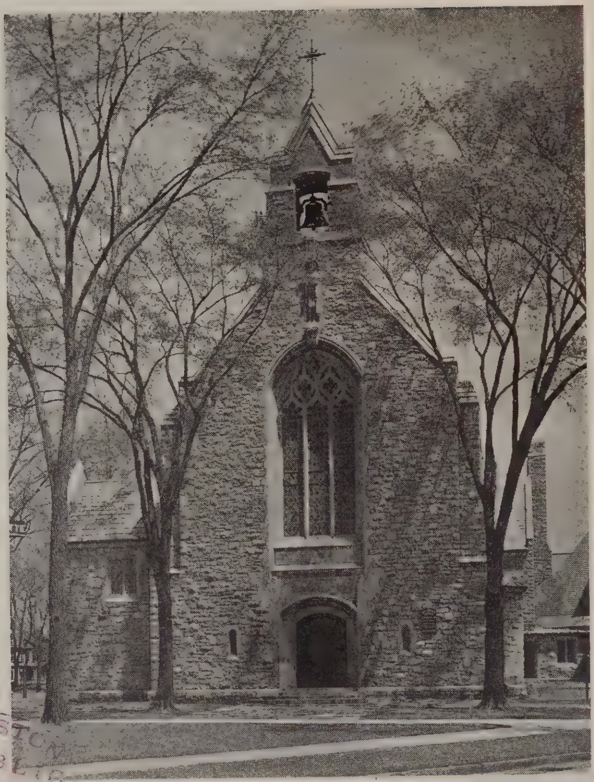


Photos. Kenneth Clark

Christ Church, Bronxville, N. Y.
Mayers, Murray & Phillip, Architects



St. John's Church, Buffalo
Mayers, Murray & Phillip, Architects

great stone reredos. The lower part of the reredos is simple,—a quiet and proper background for the altar and its gorgeous cloths and vessels. The reredos grows richer as it rises, full of symbolism and glorious carving, until it breaks into a lacy frame for the east window. This window has just been completed by J. Gordon Guthrie and is a unique and a marvelous thing. It is a composition of nothing but color. There are neither birds, beasts, saints nor fig trees in this window,—there is not even any paint on the bits of colored glass that make it. It is a veritable jewel. One wonders if any ritual, however sublime, can produce the same spiritual uplift as this gorgeous window does when one sees the sun glow through it in the early morning and find itself again in marvelous spots of pure color on the north wall of the chancel. This window will doubtless make all of the orthodox glass men shout "heretic,"—but it will also strike a new and very lovely note in the window maker's art. There is nothing richer, nothing finer and nothing like it in all the world, so far as I know.

The piers, arches and trim in the interior are of buff sandstone. The plain wall surfaces are of acoustic tile of the same color as the stone. The vault ribs are of stone, and the vaults themselves of acoustic tile with their intersections lined with gold. Little golden stars are set at random in the chancel vault. The Chapel of the Beloved Disciple is small and very simple. Excepting for a fine stone altar and reredos, designed by Mr. Murray, the only decorative elements in the chapel are in color. Guthrie is now working on the west window for the chapel and the decorations on the trusses and ceiling are being developed by Julian Berla of the architects' office. The colors of the truss decorations and the colors of the window are being studied together, which is logical and reasonable, but none the less unusual, for the truss decorations will get their only lighting through the *colored* glass of the window, and red paint lighted by daylight through green glass, for example, will never be the same red it is when lighted by daylight through clear glass.

The church is provided with "loudspeakers" and "pick-up" apparatus for the benefit of those who do not hear so well. The artificial lighting is unusual in that all of the sources of light are concealed,—no "lighting fixtures" will be visible. The lighting is arranged with dimmers and whatnot, so as to contribute greatly to the "spectacle" that makes the ritual more impressive and more inspiring. Some of the sculpture is from models by Lee Lawrie, some from models by Mr. Ellerhusen, and some from models by Miss Clere. Each of these collaborating artists has worked most enthusiastically with the church's architects.

St. John's Church, Buffalo
Mayers, Murray & Phillip, Architects

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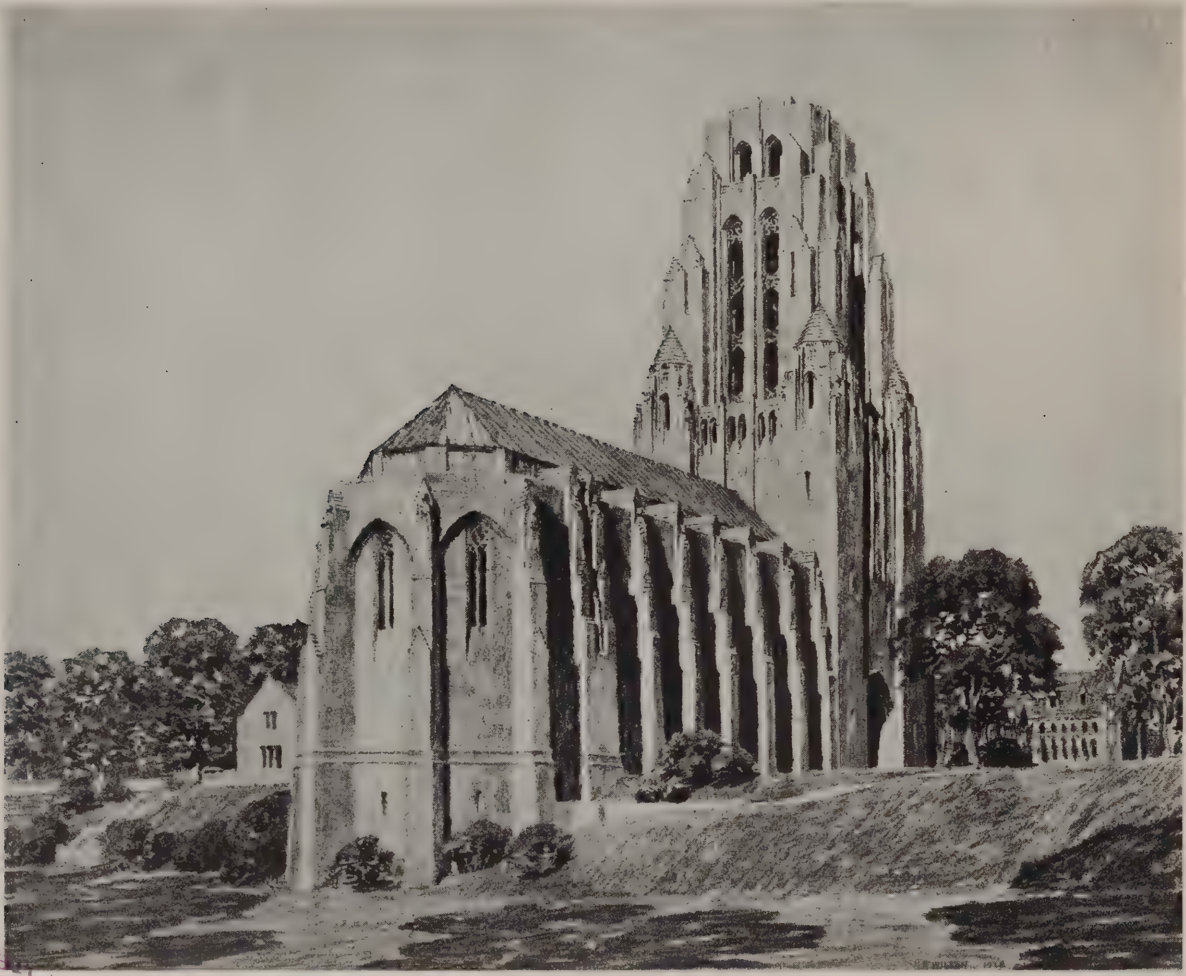
Murray is an exquisite draftsman; very few of those who have appeared in the famous *Pencil Points* pantheon can match him. It is submitted, without fear of contradiction, that no one can match him in his beloved Gothic, be it with pen, pencil or charcoal. He can invent more lovely detail than all the books in the world could ever hope to properly illustrate. Then he puts a piece of tracing paper over the sketch and makes the perfect drawing that one sees reproduced. Every line means something; every necessary line is there. All the thought and all the imagination of the Gothic centuries are in little things like this, that Murray makes in a twinkling while he sings wild songs that nobody ever heard, in a voice that doesn't at all conform to his architecture. Phillip is a marvelous draftsman too, although he may not have the patience with detail that Murray has. He had this patience once, however, for there are in the files enormous scale details of many of the exquisite Goodhue churches that all know and love, signed with his little "HP." Phillip loves to design in perspective; he doesn't design from books either, but from his wonderful store of study, thought and experience with beautiful things. He makes these little thumbnail perspectives without vanishing points or scale. Then he makes a little elevation at about 1/32- or perhaps 1/64-scale to fit the thumbnail perspective, and when he has finished, one makes the interesting discovery that the perspective had vanishing points and perfect scale all the while. The sketch of the Protestant church elevation reproduced on page 411 has everything in it that the building has (or will have), including character, detail and whatnot, and the little sketch was made at 1/32-scale way back at the start of the project. I once thought I knew something about architecture, and I was sure that I knew a lot about drawing. But that was before I knew these fellows. An architect has no more cruel critics than his fellow architects, and surely the most cruel of all should be the fellow architect who once thought he had an "architectural personality" of his own.

Not so long ago I was in the studio of a young sculptor and I expressed my admiration of some Gothic figures he had done. "Well," said he, "I have to do them over, for they should be fourteenth century, and it appears that they are thirteenth." I may have the centuries mixed, but the purport is the same either way. Mayers, Murray & Phillip believe,—and one is tempted to shout "Glory be,"—that Gothic is a principle of construction and a steady and everlasting one at that, not a matter of calendar dates. And their office works true to the Gothic tradition,—when working in Gothic,—but not at all slavishly after the Gothic archæology and even less according to



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From a Drawing by James Perry Wilson

Perspective Sketch of a College Chapel
Mayers, Murray & Phillip, Architects

calendars and geographies. And after all, that is the way the Gothic artists worked, and that, after all, is why thirteenth century Gothic differs in outer dress from its sister of the fourteenth.

Editor's Note. We consider ourselves fortunate in being able to present in The Architectural Forum this interesting and descriptive article on the design and work of Mayers, Murray & Phillip by a present member of their staff, Harry F. Cunningham. Due to the fact that Mr. Cunningham is connected with this firm, we feel that he has been reticent in his expression of the splendid work being done by the associates of the late Bertram Grosvenor Goodhue. It is our opinion that they have caught the spirit of original and individual architectural expression characteristic of all of Mr. Goodhue's work and are carrying on most satisfactorily and successfully the work of this great master. In many churches, for example, the successful and studied relation between wall surface and fenestration, between mass and height is clearly evident. In one accompanying illustration, showing the Church of the Heavenly Rest from Central Park, the splendid proportions and inspiring mass of the building will be appreciated. The sense of freedom in the handling of the buttresses and wall surfaces is characteristic of the broad expression found in the best architectural work of today. It is the contrast between the beauty of the details found in the windows and the broad, undecorated wall surfaces, which gives the charm and originality to this design. The great rose window illustrated on page 412 is one of the most successful ever conceived. Not only in the beauty of its tracery but also in the splendor and color of its glass, created by J. Gordon Guthrie, is this rose window of remarkable interest. It is tremendously effective when viewed not only from the outside, located like an exquisite jewel high up in the unbroken wall of the chancel, but also from within where it radiates a brilliance of color and design.

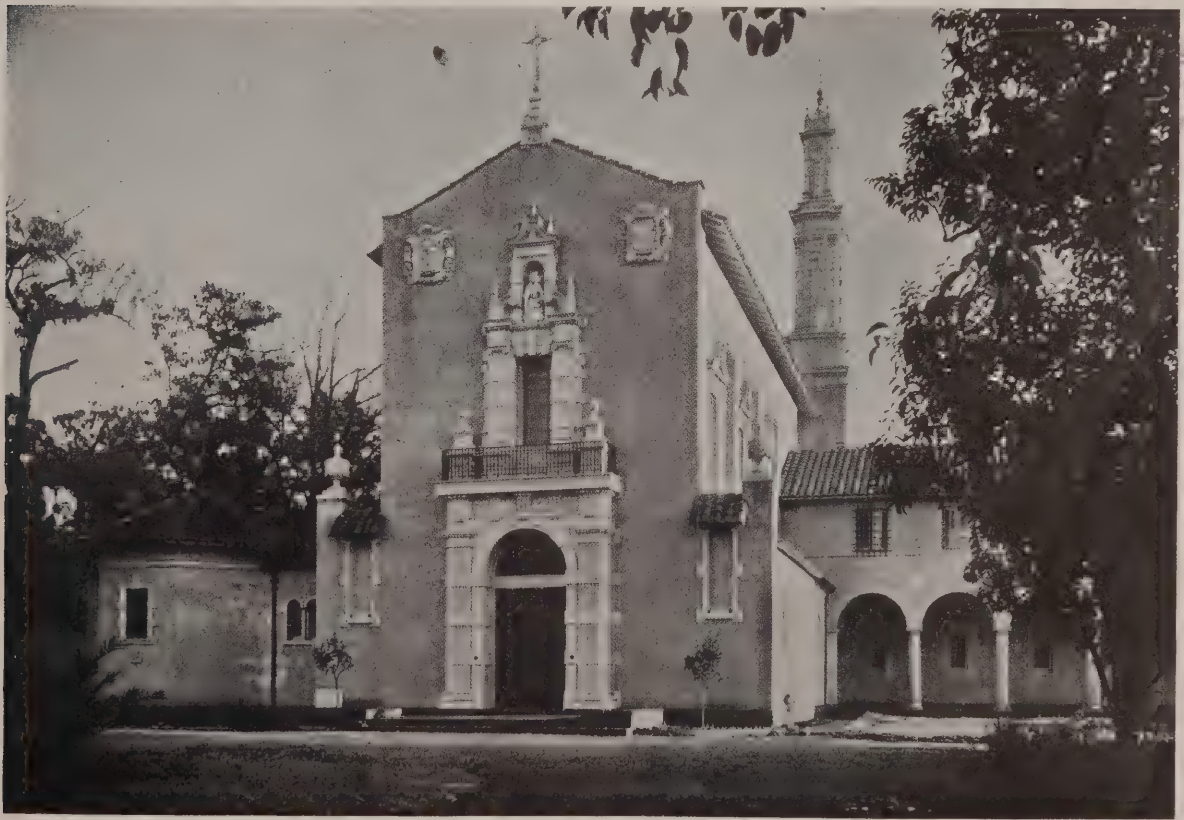
ARCHITECTURAL MODERNISM AND THE CHURCH

BY

CHARLES D. MAGINNIS

UNTIL now art in America has flourished without conviction. We did not lack a definite national consciousness, but only the capacity adequately to assert it. The unparalleled daring and initiative of the nation continued to submit problems of peculiar challenge to the architect, but history pressed tyrannously on his imagination. It was the skyscraper which made the first breach in the hitherto irksome bonds of tradition. The upward gesture, bold as it was, was not, however, without token of timidity. Ancient sentimentalities of more or less "lateral" habit were still observed clinging to strange and frightening elevations. From the quiet places of the earth delectable aspects were sacrificed to enhance the articulation of the new anatomy. Only when the terraced building emerged as an amazing consequence of the new building laws of New York was there complete release from traditional convention. The immense capacity of this act of emancipation to affect the national architecture was soon perceived. Already the dynamic genius of the pyramidal type is busy in many other cities throughout the country, even in staid communities which are concerned to possess at least the proud symbols of congestion. Commerce has found at last an appropriate format, an architecture of integrity, of resource, of nervous vigor, which is bound to exert a tonic influence on all artistic production. Architectural skill, after prolonged and intensive exercise upon the problems of modern business, has evolved a thoroughly logical and convincing symbol from the employment of new materials and new methods.

This accomplishment is great enough to bear some qualification of the exaggerated claims which are occasionally made for it. It is asserted, for example, that all departments of the national architecture are committed to the principle that history is finally and irrevocably discredited,—which provokes the question as to whether the triumph of commerce has been so magnificent as this, even in its own field. While it has unquestionably shaken off the trammels of Renaissance



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Carmelite Convent, Santa Clara, Cal.

Maginnis & Walsh, Architects

Photos: Everett E. Neukom

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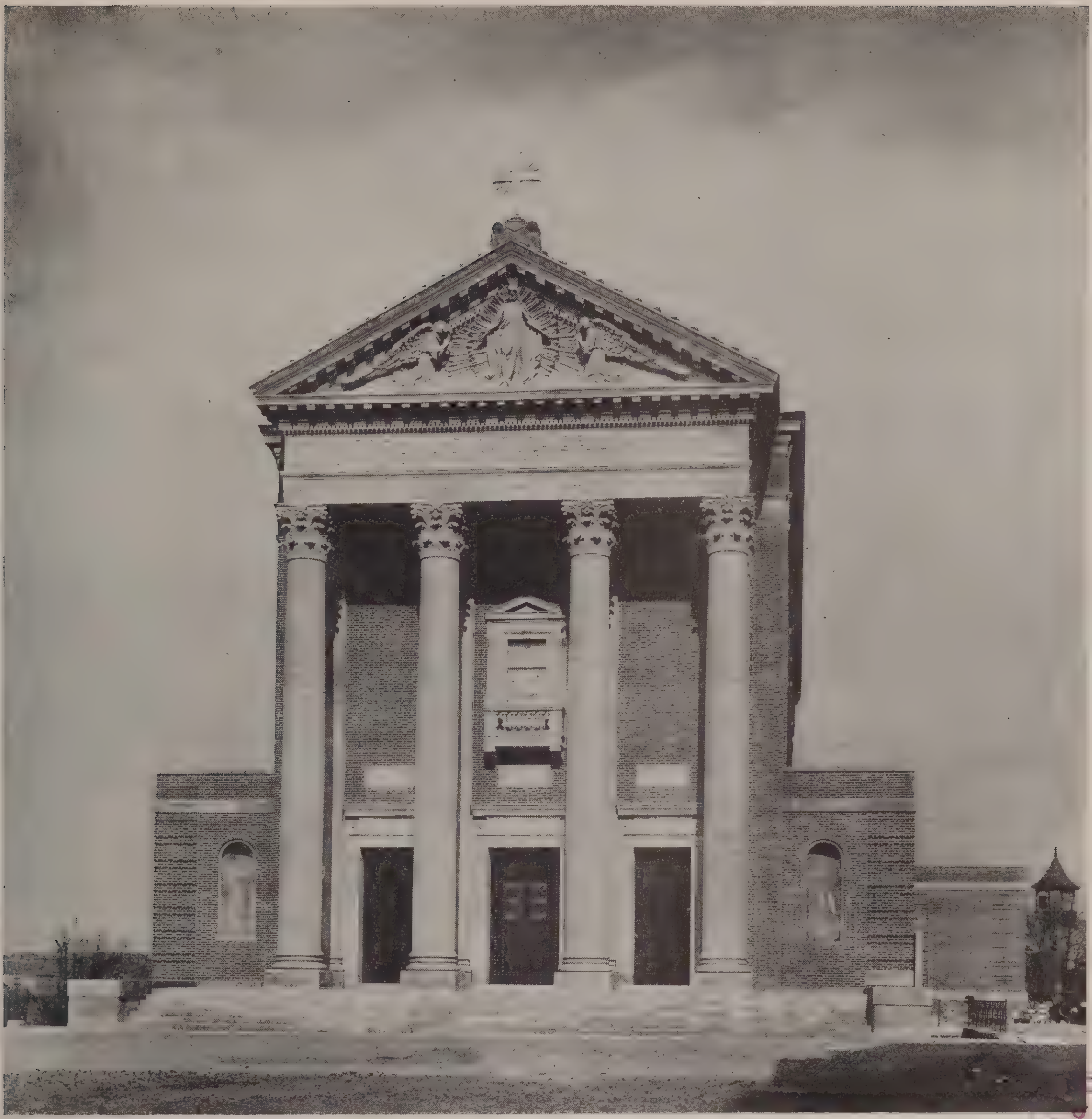
Holy Angels' Church, Dayton
Maginnis & Walsh, Architects

and post-Renaissance conventions, it is obvious that it still derives paradoxical inspiration from the records of very primitive societies. It is referred to as a wholly indigenous product, moreover, ignoring manifest affinities with the contemporaneous realism of Finland, Denmark, and Sweden. Enough remains, however, to make proud accomplishment. What matters chiefly is that through the development of a more plastic medium a new and significant sense of power has come to American art, in the light of which there is bound to be a revision of artistic values, a reexamining of old convictions. It is not too soon to speculate on the sort of compulsion which is legitimately imposed by this confident order of things upon the architecture which has hitherto been satisfied to be academic. We are chiefly concerned here with the challenge which it contains to ecclesiastical architecture. That it will ultimately react upon the architecture of the church is to be presumed. That it has beneficent capacities in this direction is even conceivable. It is important, however, to establish the limits, believing that they exist, beyond which the new influence is not warrantably concerned.

And first of all, it is to be noted that the nature of this business architecture is unique in that it derives its sanction wholly from the felicity with which it renders possible a system of construction which excludes the arch. The difference in this



Photos. Eugene F. Gray

Chapel, Holy Cross College, Worcester, Mass.
Maginnis & Walsh, Architects

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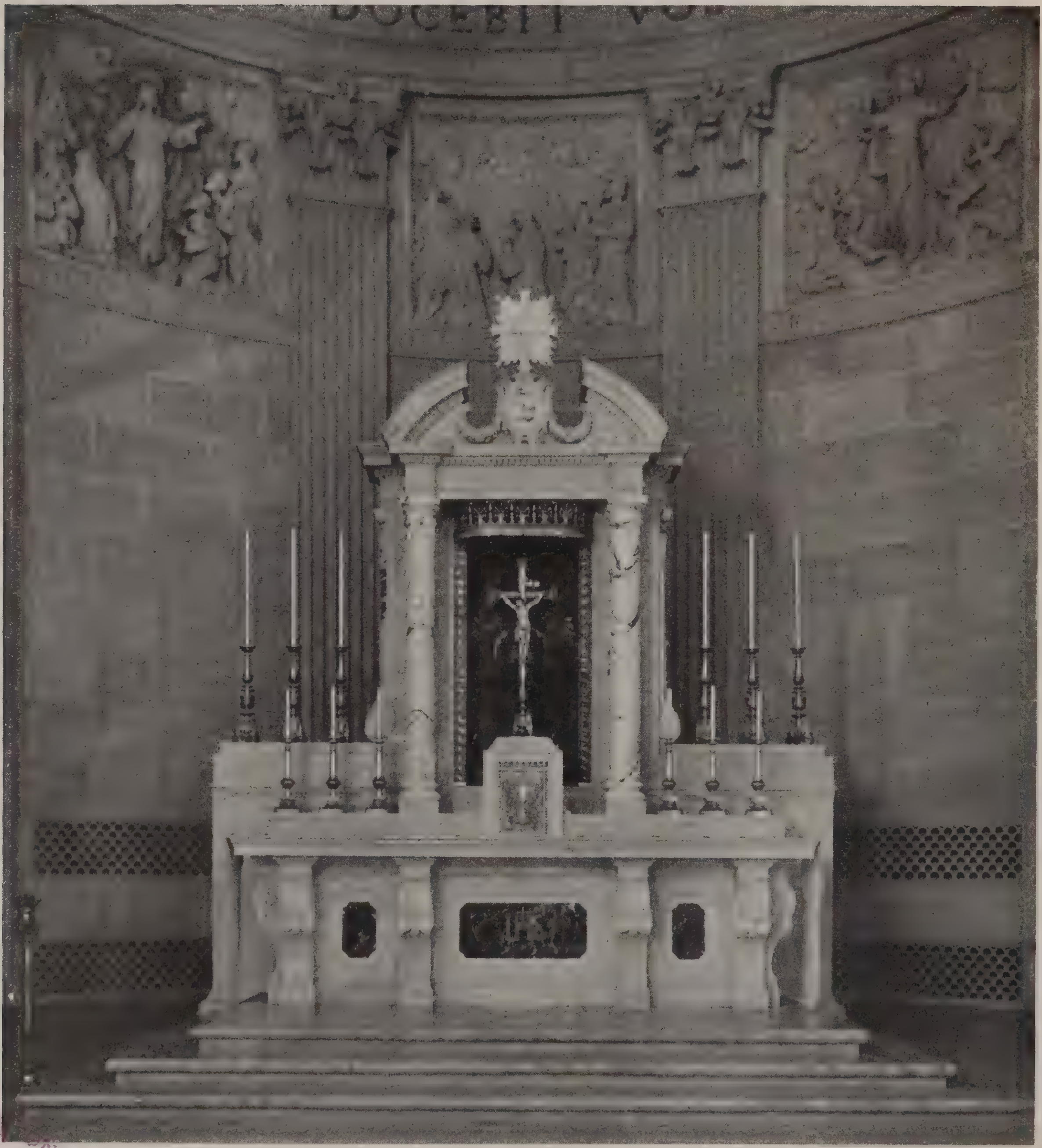
kind is, therefore, fundamental between the commercial building and the church to which the arch form and the arch principle are indispensable as an expression of the traditional fabric of masonry. But why not churches of ferro-concrete? The experiment has been attempted at Raincy, and however sympathetic, we examine the issue of it perceiving in the aridness of its cubical organism no hint whatsoever of religious sentiment, however much of the aggressive assertion of its logic may be evident. It would be impossible to present the issue in more challenging terms. A less ruthless adventure in ferro-concrete has succeeded in retaining, in the Church of St. Thomas the Apostle, in Chicago, a considerable measure of the traditional aspect, but the principle is similarly of protest. The work is marked by a distinguished skill whose resources were yet inadequate to conceal the sentimental limitations of the medium. With all the ingratiation which has been imparted to the detail, the sum of the effect falls far short of the emotional capacity of the types from which it has made so conscious and deliberate a departure.

It is significant to note in this connection that the advocacy of ferro-concrete is invariably associated with the plea for an untraditional church plan, which is the less convincing in that the vindication of each is palpably dependent on the other. We are advised, for instance, that the



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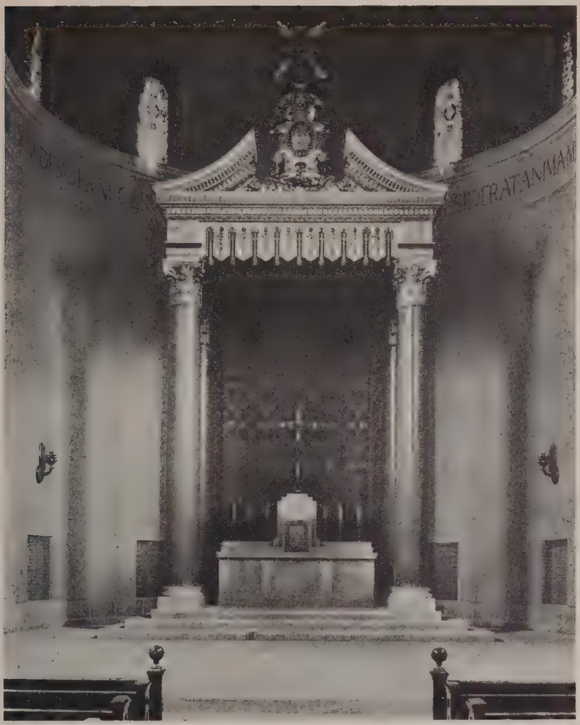
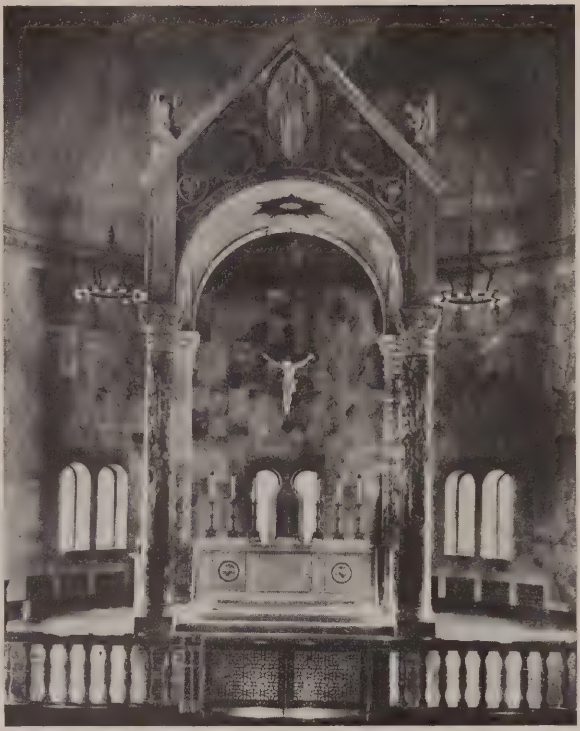
Photos. Paul J. Weber

Chapel. Scholasticate of The Society of Jesus, Weston, Mass.
Maginnis & Walsh, Architects

piers and columns which divide the church longitudinally for the support of the clerestory are a gratuitous visual infliction, and the recessed sanctuary, which develops from the extension of the nave, is a mediæval anachronism which should be suppressed in the interest of advancing the altar into intimate touch with the congregation. As a matter of fact, however, this singular concept, which in effect would represent the exchange of a venerated organism of liturgical significance for the bald outlines of the meeting house, is wholly without responsible Catholic sanction. There is something ironical, moreover, in the proposal that the Catholic Church should thus stultify itself at a time when the Episcopalians are more and more emphasizing their attachment to the mediæval idea, and when even Evangelicals are forsaking their traditional austerities! Nothing is more unlikely than that the Catholic plan will submit itself to the direction of any principle which assumes priority over that which recognizes the Divine Presence in the tabernacle of the altar. That



Chapel, Holy Cross College, Worcester, Mass.
Maginnis & Walsh, Architects



Chapel, Trinity College, Washington
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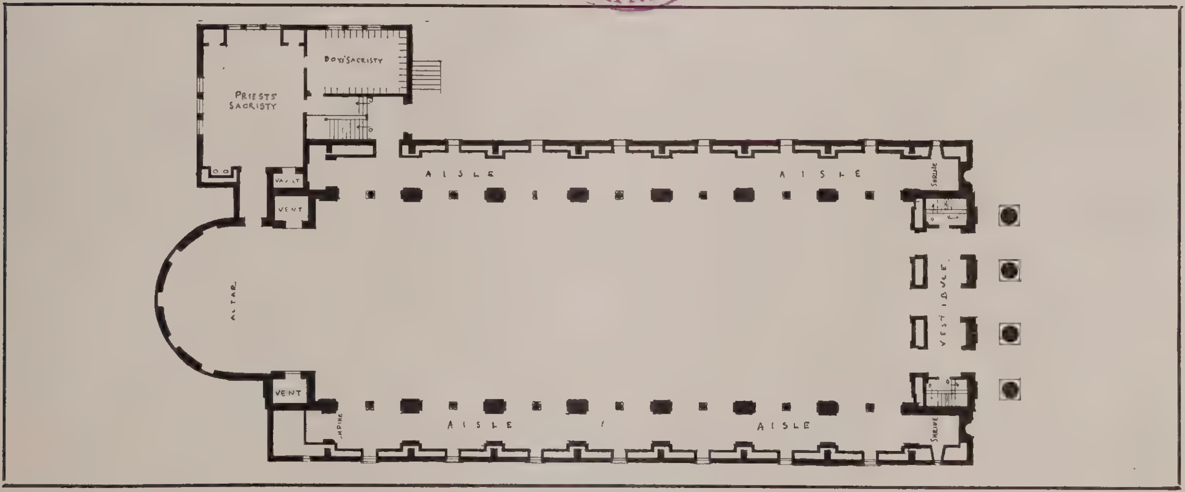
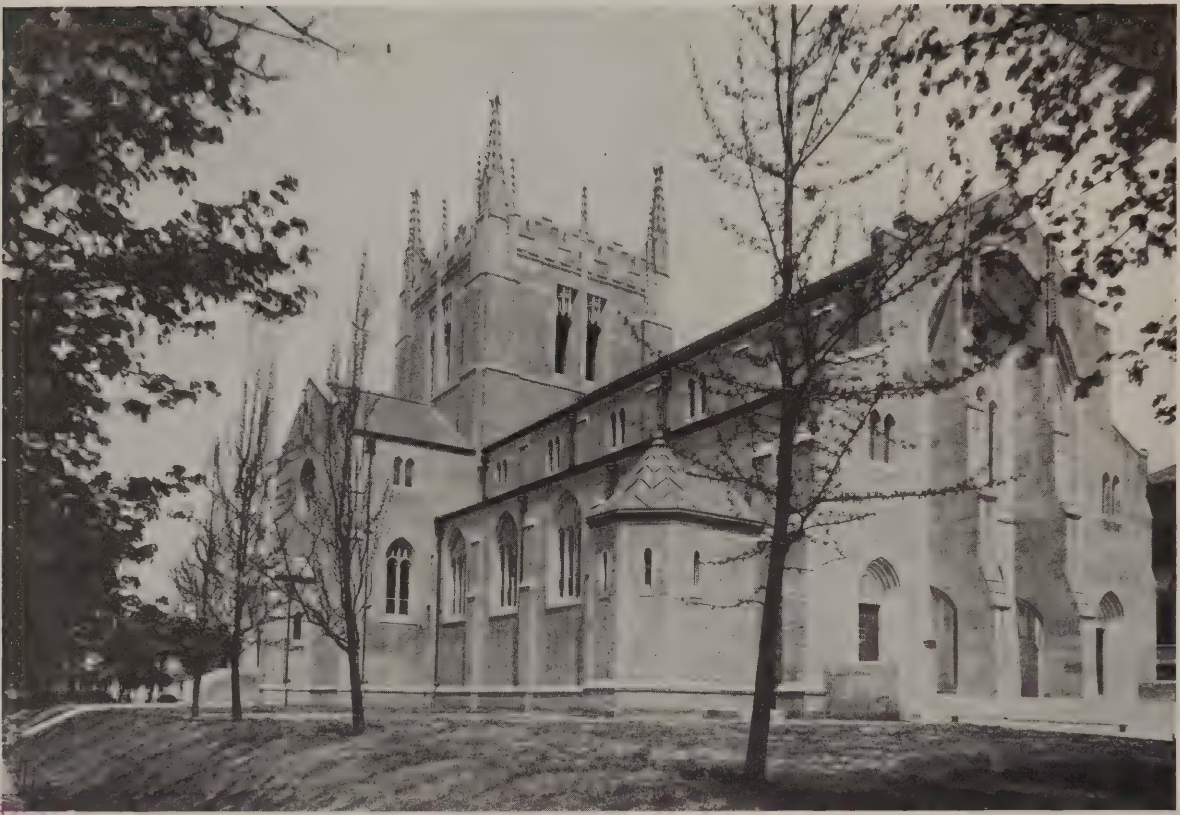


Plan of Chapel, Holy Cross College

principle is abiding and immutable. Those architectural forms which most effectively carry the emotional implication of that idea are the best forms. The available materials which relate logically to those forms are the acceptable materials.

Abstractly, the nature of the church problem is almost absolute. Practically, it is qualified only by the requirement that accommodation shall be provided in the plan for a given number of worshipers. This, the only realistic element of church design, has, it is true, developed an embarrassment in the fixed pew which implies the definite orientation of full congregations periodically assembled,—a condition which has reasonably made for the modification of some historic types without substantially affecting their validity. The terms of the ecclesiastical problem remain to all intents and purposes what they were. Nor has anything transpired to compel a change from the academic spirit in which it has been customary to address it. It would be difficult to name an historic ecclesiastical system which is not at this moment as significant and pertinent as ever to the dogmatic and liturgical position of the



HOLY ANGELS' CHURCH, DAYTON
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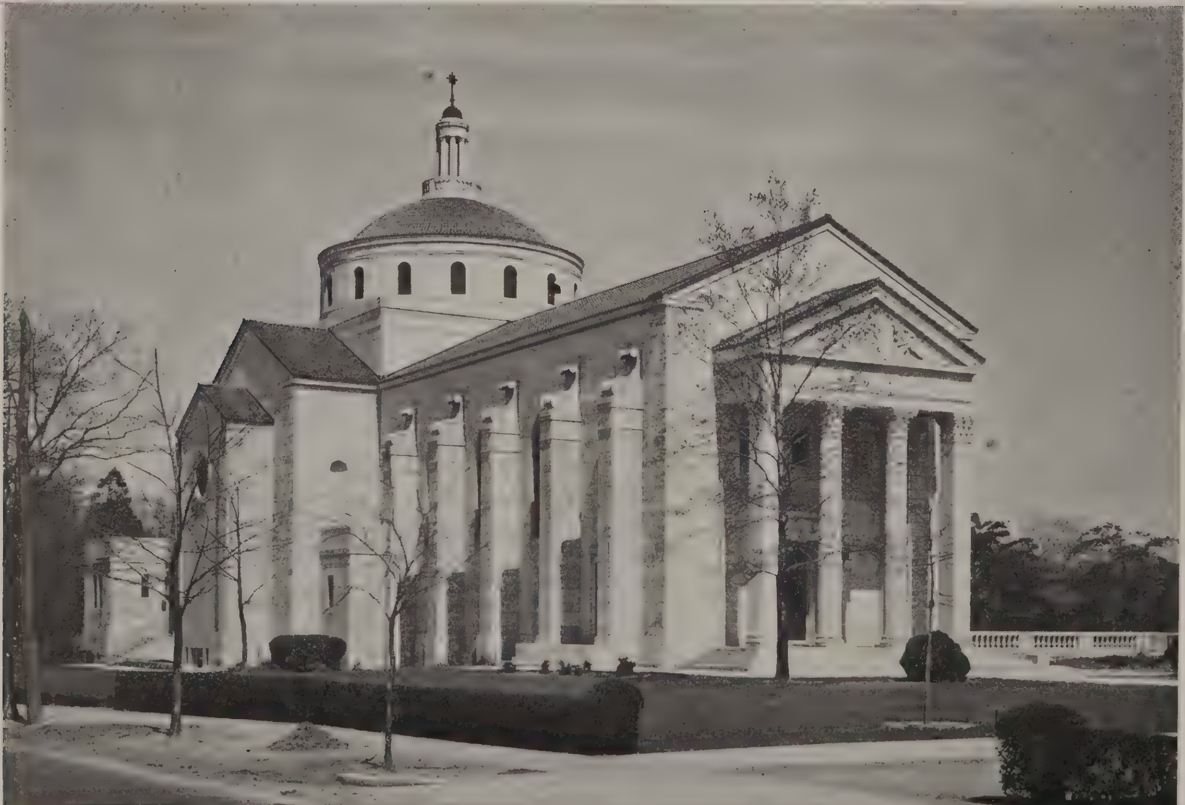

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CHAPEL. TRINITY COLLEGE, WASHINGTON
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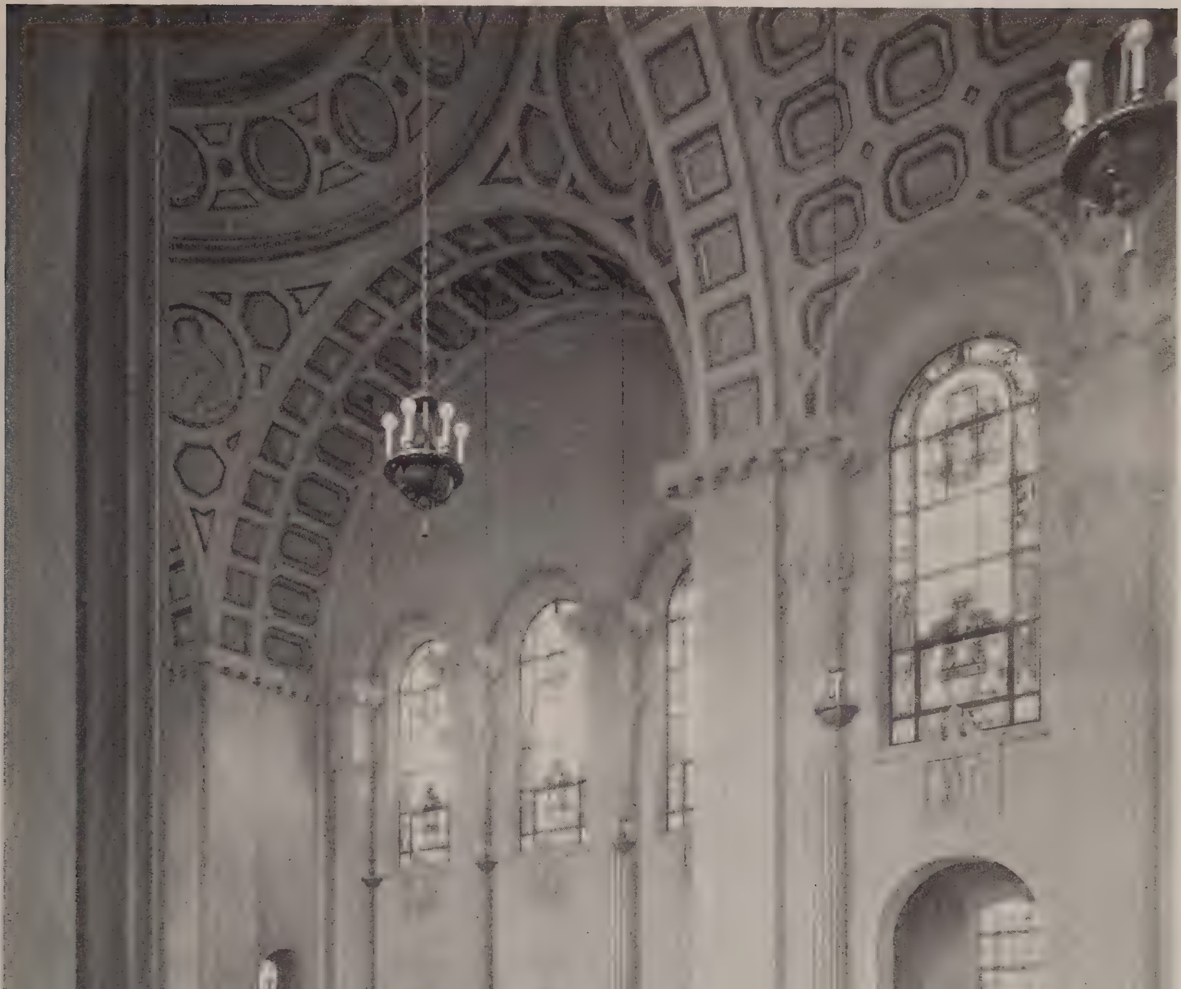

CHAPEL, SCHOLASTICATE OF THE SOCIETY OF JESUS, WESTON, MASS.
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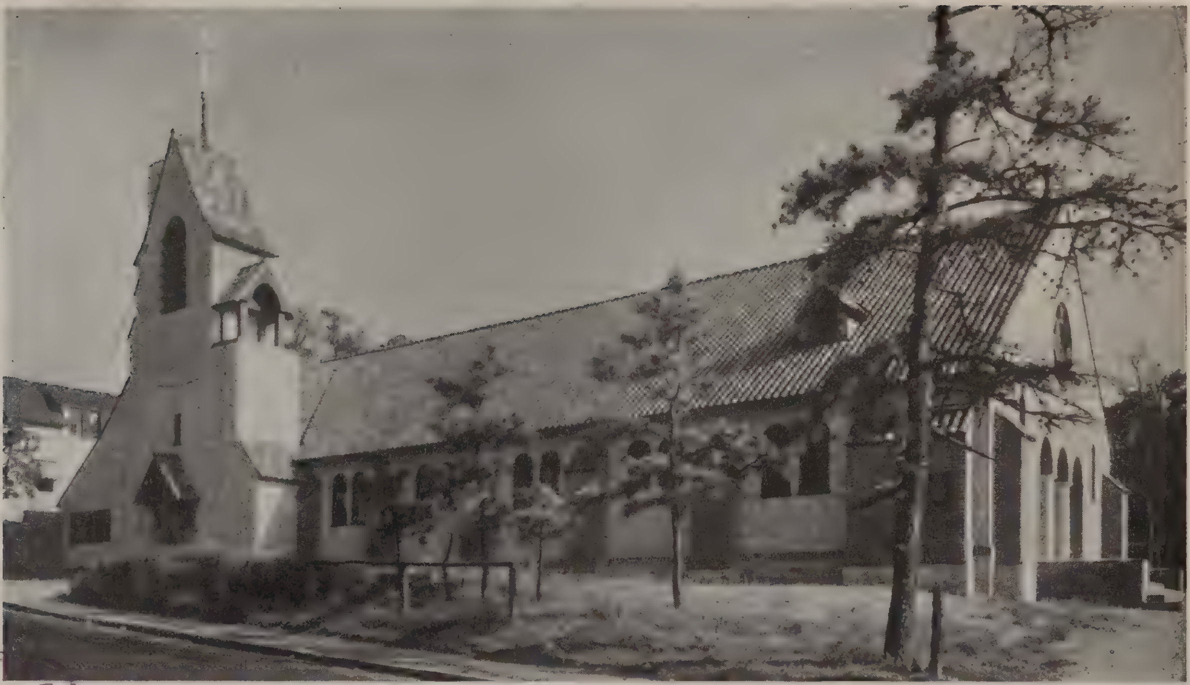

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Photo. Paul J. Weber

Church of Our Lady Star of the Sea, Onset, Mass.
Maginnis & Walsh, Architects

Catholic Church. This is not to say, however, that the art of such an institution may consequently escape the stigma of archæology. However reminiscent it may be, there must be principle of growth. From the movement which is now making so notable a contribution to civic beauty, there are doubtless enlisted capacities as yet undisciplined which may ultimately touch it.

Many circumstances,—political, social, scientific,—have contributed to interrupt the continuity of the ecclesiastical tradition, but the principle of vitality, if it be lacking, is not to be recovered by an abrupt and violent deflection of the current which has lifted the Christian architecture of America to its present extraordinary estate under Gothic inspiration. New philosophies, I venture to say, will be hard put to it to find symbols which will displace, in critical esteem, those beautiful and convincing forms associated with the names of Cram and Goodhue. The self-conscious persuasion of such an architecture to the secular thought of the day would be impertinent and incalculably mischievous. It must be remembered always what the function of architecture is.

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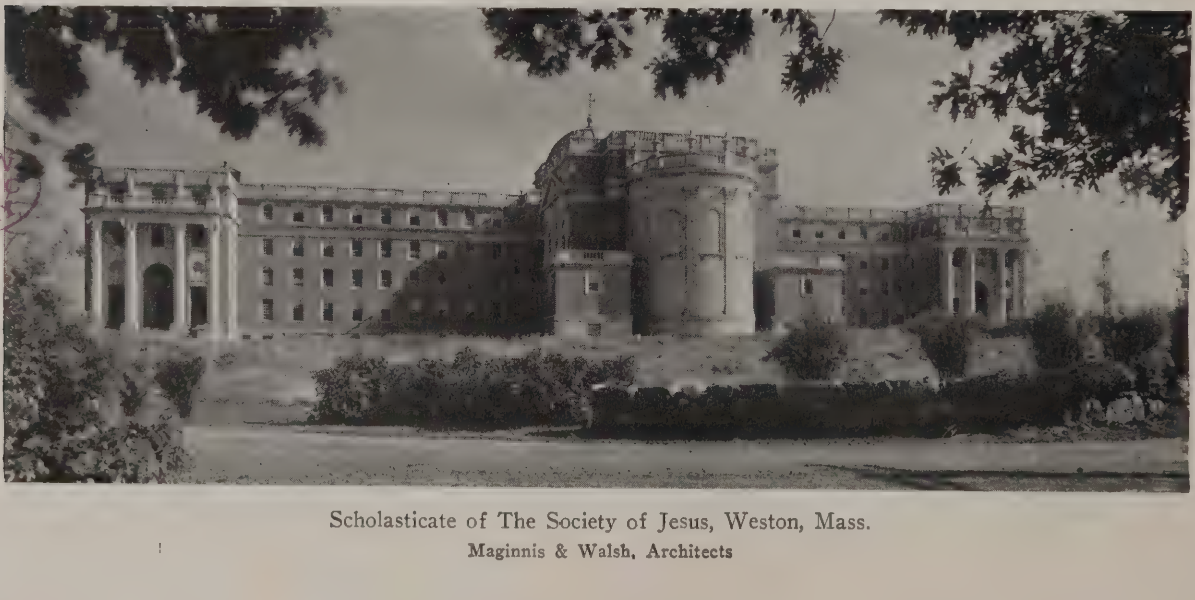

Scholasticate of The Society of Jesus, Weston, Mass.
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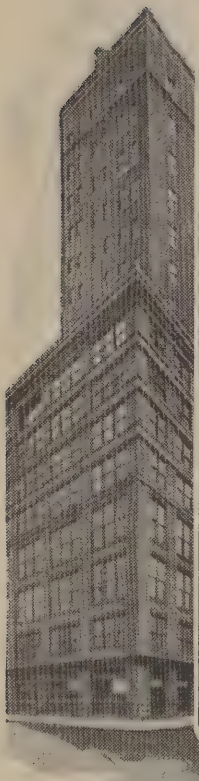

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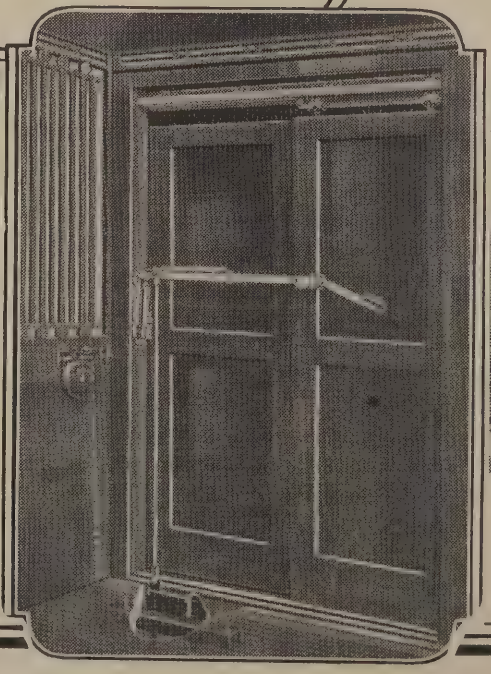

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TURN TO "SWEET'S"

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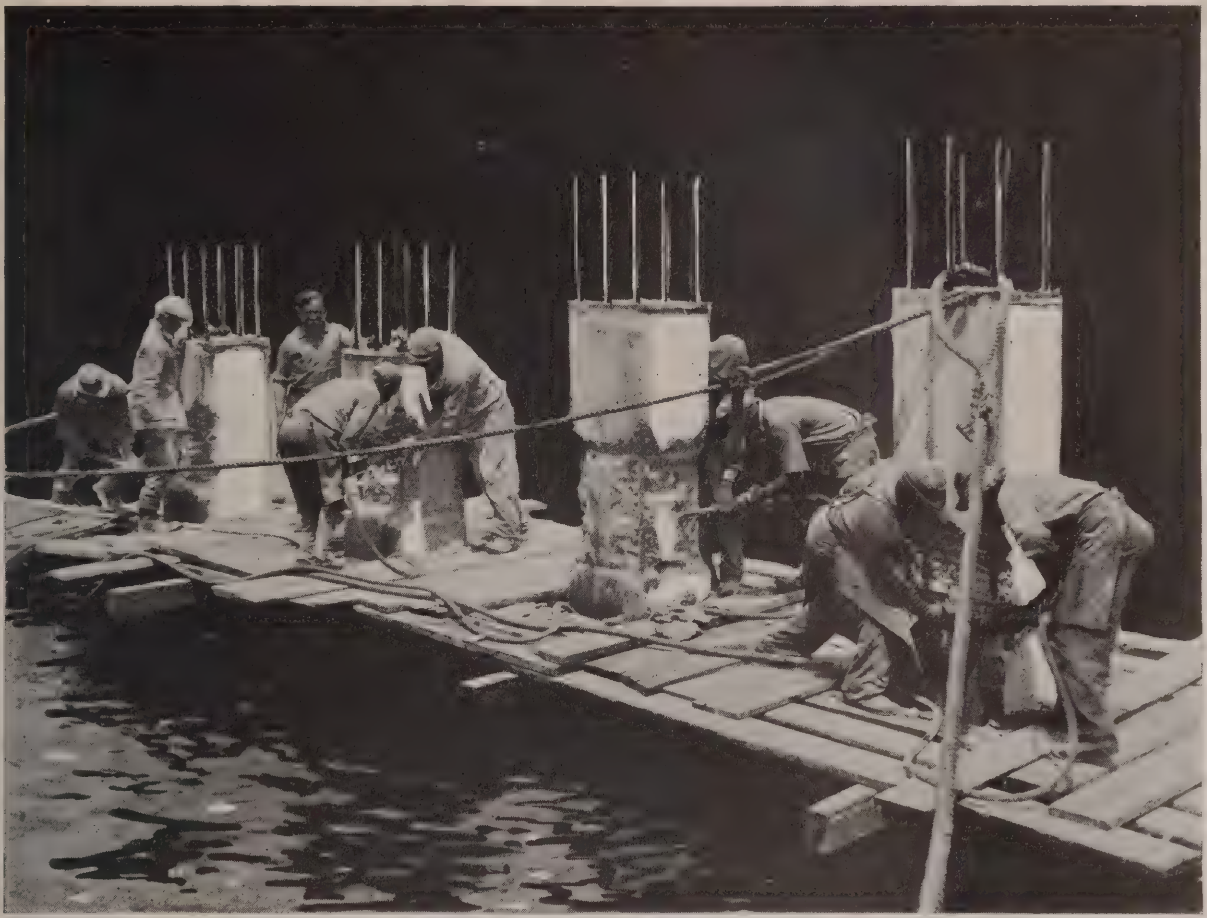

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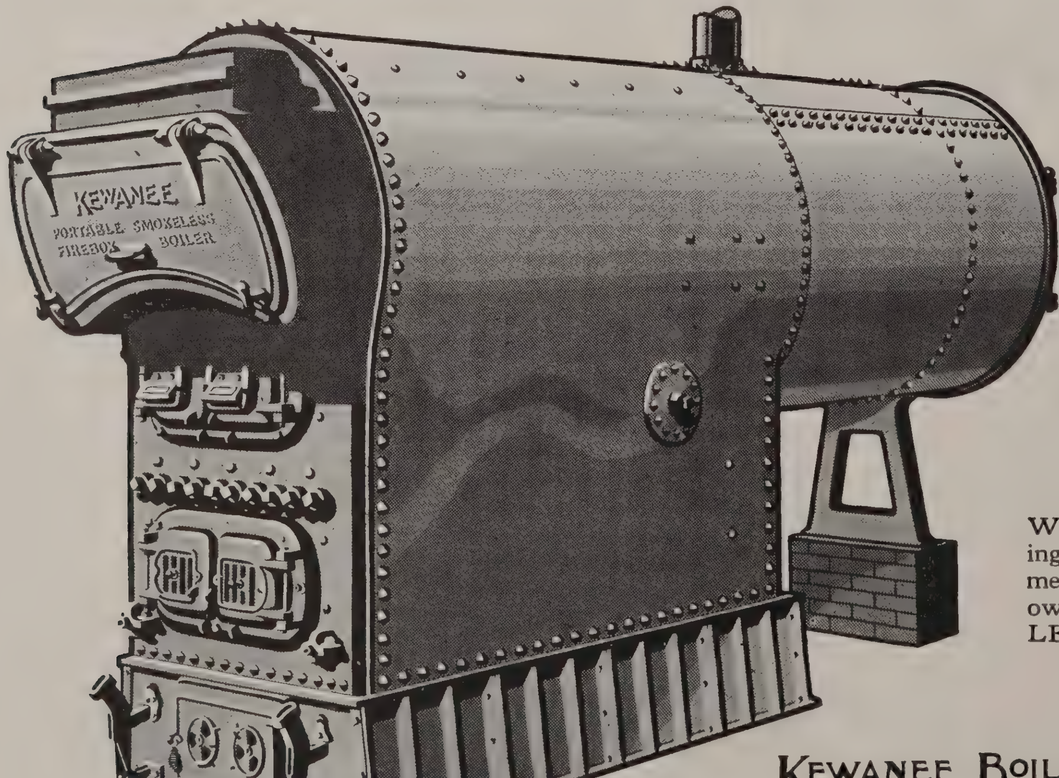

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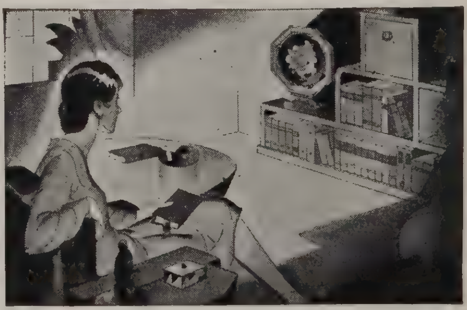

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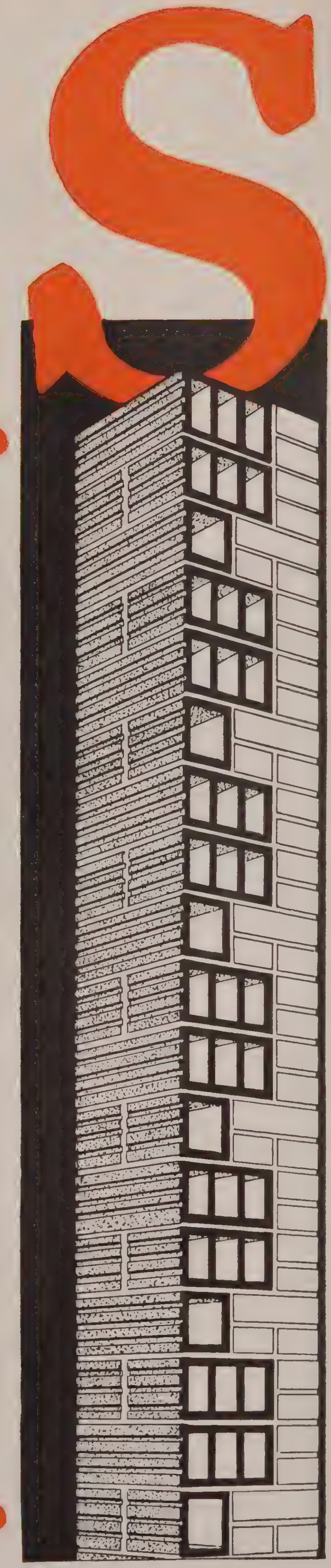

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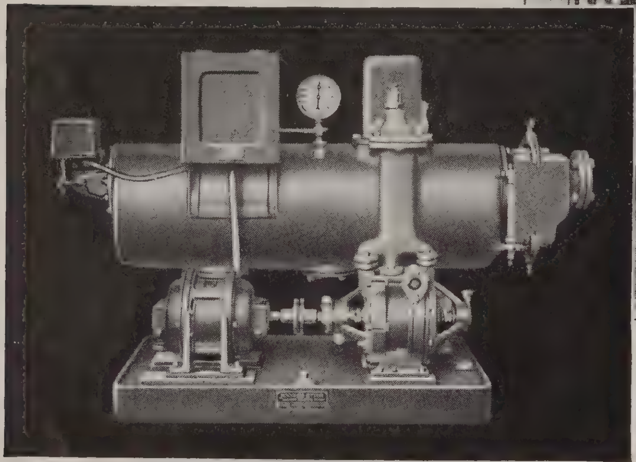

The 386 Fourth Avenue Building, New York, N. Y. Almirall and Cusachs, architects; Eadie, Freund and Campbell, consulting heating engineers; Wolff and Munier, Inc., heating contractors; 386 Fourth Avenue Corpn., owner. Equipped with Jennings Vacuum Heating Pump.

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In the construction details of its heating system, the 386 Fourth Avenue Building is typical of present-day practice in many modern office buildings.

A vacuum return system heats the building. Steam is supplied at a pressure of approximately 100 lbs. per sq. in. from the mains of a central station steam company and connected with the heating system through reducing valves at a pressure slightly above atmospheric. There is approximately 28,000 sq. ft. of radiation in the building.

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BOOK DEPARTMENT

DRAWING WITH PEN AND INK

A REVIEW BY

CLIFFORD WAYNE SPENCER

OF all human achievements, perhaps that of being able to make graphic representations of the objects by which we are surrounded and portrayals of the events that go to make up our daily lives, is the most remarkable. It is indeed a remarkable thing for a person to be able to place on a small plane surface such outlines and gradations of tone that the beholder is at once given an impression of great distance and vast area, and that in this manner man is able, to some extent, to imitate and preserve the fleeting beauty of nature itself. The development of the various means of representation has been accompanied and made possible by the introduction of a great number of conventions and mannerisms, by means of which much more can be conveyed to the observer than would otherwise be possible. Of course this implies a certain amount of understanding of these conventions on the part of those who are to behold the finished pictures, so it is nearly as important that the lay public be educated as that the artists themselves be clever in portraying their subjects. This knowledge and taste are usually acquired by the process of viewing and studying a great number of examples, and much can be and has been accomplished in this manner by both the artists and those who are interested in pictures.

However, for a fine appreciation one should go much deeper and make a study of the principles and methods underlying the making of the pictures. Of all the mediums available, each has its own peculiar characteristics, its advantages and limitations. Sculpture has the advantage of being able to copy form exactly, and to suggest action, but it has not been found desirable in most cases to portray color in this medium. On the other hand, painting, while making possible beautiful color combinations, must resort to conventions and subterfuge, to a great extent, in suggesting solidity of form. In this attempt great success has been achieved by the painters of the past, and doubtless still greater results will be attained by the so-called "modernistic" schools of painting, whose principal efforts are being exerted in the attempt to more forcefully portray form in painting. Black and white painting is subject to the same restrictions as color painting, with the added necessity of suggesting various colors by the use of graded attenuations of the gray tones. This can be done with comparative ease in black and white and wash painting, and even with charcoal, crayon and pencil an unlimited variety of gray tones may be produced. It is in pen and ink drawing that the greatest difficulty is found in suggesting form and color. This difficulty gives rise to much use of conventions, and there is no doubt that in pen and ink drawing more conventions are employed than in any other form of art work. The outline, which is a highly conventionalized form of drawing, since in reality solid objects have no definite outline, is much used, and form and color are suggested by the use of conventional markings such as dots, parallel or crossed lines, or other markings which in reality do not occur in the object at all. The line produced by the pen is very definite and black and cannot in itself be shaded; the lines are comparatively fine, and pen drawings are therefore rather small in size as a general thing. On the other hand, the remarkably striking effects of contrasting light and shade, the vigorous outline and suggested action, that can be attained in this medium, coupled with its adaptability to modern commercial reproduction and the way in which pen and ink drawings harmonize with the printed pages on which they are to appear, have made it immensely popular as a means of graphic representation.

Pen drawing was used by the early masters of painting as a means of recording impressions and making preliminary studies to be used in their paintings; also much beautiful work with the pen was produced by the book illuminators of ancient times, but it was not until quite recently that it has had any development as an art in itself. Its special adaptability to commercial uses is perhaps the greatest factor in this development, and the large volume of this work being used in that way constitutes a testimonial of its popularity among advertisers and publishers as a medium for architectural rendering. It is unsurpassed, due to the simple and direct way in which the form and beauty of a proposed building can be brought out, and the ease with which the necessary materials may be obtained. In the matter of the technique which is to be used by the student of pen drawing there is considerable contention, many maintaining that technique is an individual attribute which should come naturally and develop as the student learns to draw, and that no attempt should be made to teach it in the schools and art classes. They claim that the technique of an artist is comparable to a person's handwriting, that the technique of each is different and individual, and that it should come naturally.

This, of course, is true, but Franklin Booth, the well-known commercial illustrator, in his introduction to A. Guptill's book, "Drawing With Pen and Ink," says that "technique can and should be taught in a general way, not that any formula should be given or that any special manner of line handling should be looked upon as alone licit or orthodox, but that through instruction and study, line development may be achieved and a finesse in individual technique may be facilitated." The work itself is a comprehensive textbook on line technique, starting with the most rudimentary considerations, such as the manner of drawing and spacing lines and developing

An Authoritative Work on

"THE GREEK REVIVAL"

By HOWARD MAJOR

THE search for effective types of architecture for domestic use led logically to the re-discovery of the style known as the "Greek Revival." In the hands of a few particularly skillful architects it is being used with marked success, their use being based largely upon study of such examples as have survived the period, just prior to the Civil War, when use of the type was widespread throughout the United States. It is an entirely American style, founded not upon a following of current English architecture but upon a study by Americans of classic types adapted to domestic uses.

Mr. Major's excellent work is the result of a careful study of the style as it was interpreted in the North and East, and particularly in the South. The illustrations of exteriors and interiors are full of suggestions for anyone seeking a variety of architecture bold, simple and effective, which supplies a fitting background for life in America. The book is richly illustrated, and shows existing work, large as well as small, in both city and country.

236 Pages; 7½ x 10¾ inches. Price $15

THE ARCHITECTURAL FORUM
521 FIFTH AVENUE NEW YORK

through all the intricacies of the art of pen drawing There is also a brief discussion of brush work and some consideration of the use of colored inks, but the main portion is devoted to pen work in black and white. As is to be expected and desired, the book is profusely illustrated and contains a veritable gallery of the best work of the prominent artists in pen and ink in both the advertising and the illustrating fields, as well as architectural subjects of all kinds. There are charmingly imaginative drawings by John R. Neill, striking illustrations by Herbert Railton, Gordon Grant, Wallace Morgan, James Montgomery Flagg, Thomas Fogarty, Willy Pogany, Rockwell Kent, Charles Dana Gibson, Franklin Booth, and a large number of prominent illustrators. There is also a large proportion of architectural subjects, both sketches and renderings, including work by Bertram Grosvenor Goodhue, Louis C. Rosenberg, Samuel O. Chamberlain, Schell Lewis, H. V. Magonigle, and many others. These drawings are all presented as nearly as possible at the original sizes, and in most cases the dimensions of the originals are noted so that an idea may be had of the way in which they were drawn. They are located near the text to which they apply, and in many instances references are made directly to the text. The comments by the author contained in the captions are interesting and instructive. A large number of drawings and marginal sketches by the author are shown to illustrate some particular part of the text, and they are drawn with that end in view. The marginal sketches and other drawings are very useful as a graphic index, so that a reader glancing through the book can readily locate those portions of the text which contain the greatest interest for him. Mr. Guptill's experience as a teacher of drawing, as a commercial artist, and as an architectural renderer, makes him particularly fitted for preparing a work of this kind, and it is most complete in every respect.

Though some portions of the work are general in character, the greater part of the space is devoted to subjects of direct concern to those interested in architecture.

After a thorough discussion of outline drawing and light and shade there is a chapter on the selection and use of plaster casts, followed by chapters on "Life Drawing and Basic Principles of Composition." The chapter entitled "Photographs and How to Use Them," is interesting to architectural sketchers, as it describes various methods of making interesting drawings, using photographs as models. Reproductions of photographs are shown, and in connection with them are sketches in ink, copying the photographs or portions of them in different manners. There are diagrams showing just how to choose that portion which has the best composition and the greatest interest. The sketches also show how values and details of the original may be changed to improve the finished sketch. The chapter entitled, "And So Why Not Go A'Sketching?" should also be of more than usual interest to the architect or student. Perhaps one of the most difficult things for many students to master in presenting architectural subjects is the drawing of a pleasing and convincing looking *entourage*. This subject is very well handled in the chapter, "On the Presentation of Trees." Here the word "trees" is meant to be inclusive and deals with shrubbery, vines and grass as well as with the trees themselves. The next chapter will readily be appreciated by the architectural profession,

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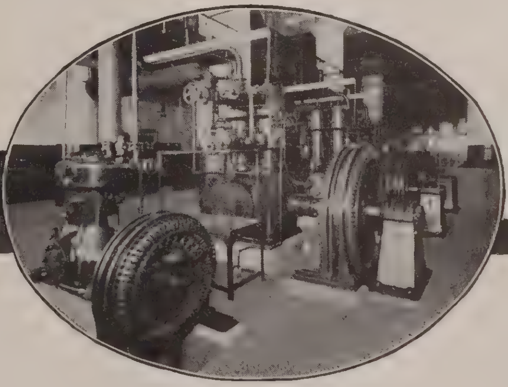
YORK refrigeration supplies a superior service that justifies the architect's judgment in recommending it.



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the title being "Indicating Parts of Buildings." It tells how to represent doors, windows, roofs, chimneys and other similar details. Architectural rendering is completely treated in the three next chapters, the first telling of "Architectural Rendering Methods," the second of "Rendering the Complete Building," and the third of the "Larger Architectural Problem." These chapters are profusely illustrated with examples of the work of the most successful architectural renderers, and the text gives a very careful description of methods and a discussion of the results attained in the examples shown. Rendering methods are applied to interior subjects in a later chapter entitled "Interiors and their Accessories," showing various ways of presenting interiors in an attractive manner. The remaining chapters are of a more general nature, being entitled, "The Pen Combined With Other Mediums"; "Suggestions on the Use of Color"; "A Brief Discussion of Reproduction"; "Additional Advice on Reproduction"; "Special Materials and Odd Methods"; "The Silhouette and Its Application"; "Thought on Decorative Drawing," and "Book and Magazine Illustration." These chapters are short but contain a great deal of interesting as well as useful information to supplement that contained in the chapters dealing directly with architectural subjects. Each of the chapters is written independently, and each may be read and understood without the necessity of having read the earlier chapters.

DRAWING WITH PEN AND INK. By Arthur L. Guptill. 444 pp., 9 x 12 ins. Price $8.50. Pencil Points Press, New York.

AS was to be expected, architecture has kept pace with industrial progress and has assumed many of the characteristic aspects of big business. In most cases a successful architect must be a combination of an astute business man, a clever technician and engineer, and an inspired artist. He must be able to cope with the highly practical viewpoints of men who are in a position to use his services; he must be something of a lawyer and understand the legal phases of building processes; he must be a clever salesman in order to sell his services in the face of keen competition; he must understand the laws of economics and real estate finance in order that the buildings he plans may return the highest possible profits on the investments. He must be able to make his designs so that not only the finished drawings and sketches, but also the completed buildings may satisfy the æsthetic demands of at least a large part of those who are to behold them. In addition to all this, the buildings must be structurally sound, sanitary and well equipped mechanically, and considerable knowledge of engineering practice is necessary on the part of the architect to insure their being so.

But, after all is said and done, an architect is essentially a planner of buildings and undoubtedly always will be. This is one branch of the work in which every member of an architectural organization must have rather more than a rudimentary grounding. There has been in the past, and probably will continue to be, much contention among the various schools of thought on architecture, as to whether the exterior of a building should frankly express the plan or whether a pleasing exterior should be designed and the plan made to fit. As a matter of fact, it is quite safe to say that neither of these methods can be followed exclusively, it being

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Edited by
Frederick Chatterton

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104 pp., 9¾x12 inch. Price $7.50

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It is doubtful whether the Superintendent of Bridges, who originally specified Dixon's Paint in 1901, expected to get so many years of protection out of that one paint job. But there was very little doubt in Mr. Atkinson's mind when he came to select material for repainting.

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necessary, in most practical problems, to make concessions in both the plan and elevation design. Each individual problem must be carefully considered according to the requirements and conditions to which it is subjected. There are, however, certain underlying principles and methods of proceeding which apply to all classes of buildings in a general way, and a still greater list of considerations that can be applied to each group of buildings as a class. These principles and considerations may not be adhered to strictly in all cases without entailing considerable risk of unsatisfactory conditions. Yet, when supplemented by much careful original thought, they furnish a basis on which to proceed, and tend to give a much better understanding of the planning problem than might otherwise be had, and to facilitate solution.

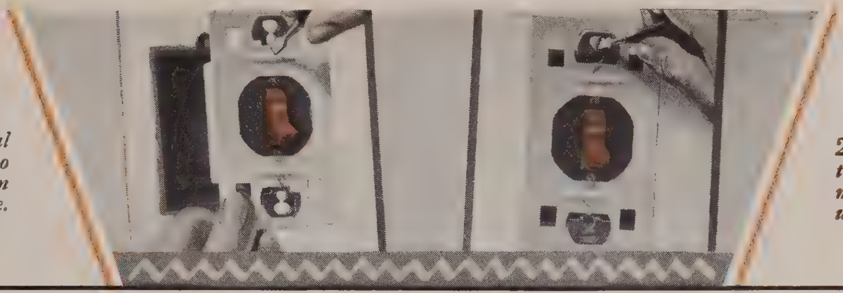
It is just such a statement of principles and facts that forms the subject matter of the book, "The Principles of Planning Buildings," by Percy L. Marks. This work has been a standard treatise on the subject for many years, both abroad and in this country. The fourth edition has been recently issued and embodies considerable improvement over the earlier editions, in addition to having been brought up to date. The work is something in the nature of a checking list and is arranged so that an architect confronted with the necessity of planning a building may turn directly to that particular class of buildings and find a detailed list of all the requirements and features necessary to be taken into consideration. As an example, the class of buildings known as *abattoirs* which, the list being arranged alphabetically, comes first, is given thus: *"Abattoirs,*—(a) Plentiful accommodation for animals in reserve and under treatment; Uniform temperature; Good lighting and ventilation; Economical service; Seclusion; Distribution of buildings; Ample cold storage. (b) Lairs and pens; Slaughter halls (killing sheds) for the various animals; Cooling, salting and pickling rooms; Cold stores and chill rooms; Courts for sorting out the animals; Tallow melting rooms with coppers; Tripe cauldrons; Rooms for preparation of by-products; Pathological rooms; Superintendent's quarters; Offices; Machinery for registering and weighing; Stores; Latrines; Workmen's baths and lavatories; Mess rooms and kitchen; Boiler house; Coal stores; Pumping machinery; Destructor for offal and condemned meat; Stables; etc." This is followed by text matter describing the special features and general characteristics of this class of buildings and is illustrated by two plans of the *abattoirs* at the dockyard, Chatham, England. The long list of building classes that follows is treated in the same manner and is illustrated, in all instances, with plans of buildings actually constructed. Although the plans shown are all of buildings constructed in England and the text matter is written from the British standpoint, the problems are always similar to and in many cases identical with those met in America.

The broad general principles of planning, which are very concisely enunciated at the beginning of the book, cover these various points:—(1) General scope; (2) Requirements in accommodation and size; (3) The relation of site to adjoining buildings; (4) The extent of corridors; (5) Aspect; (6) Privacy; (7) Roominess; (8) Furniture requirements; (9) Prospect; (10) Grouping; (11) Planning in its relation to elevators; (12) Economy; (13) Axiality; (14) Acoustics. These are elaborated on somewhat in the opening chapter and are treated more fully further along in the volume. The list is given herewith with the idea of enabling the reader to realize how completely the subject is treated; it must be understood that the term "economy," as used in item 12, of the list, refers to economy of service, and that no attempt is made to enter into the matter of costs.

In addition to the chapter entitled "Essential Features," which is composed of the check lists already described and which occupies nearly a hundred pages, covering all classes alphabetically from *abattoirs* to workmen's clubs, there is a great deal of value and interest in the remaining shorter chapters, especially in that on "Domestic Planning." This class of buildings, being of such great importance and requiring so much discussion, was not treated in Chapter 3, but is here given full and careful consideration. The modern domestic building, while based on the precedent of the historical styles, is subject to a great many conditions that did not formerly exist. This is partly due to changes in the economic status of the working classes and to improvement in traveling facilities and to scientific discoveries and their application to the enjoyment of everyday life. The types of domestic structures are so many and varied that it would be impossible to establish any very rigid principles in respect to this type of architecture, but in this chapter the author has endeavored "to suggest by examples and illustration, the solution of typical problems, so far as type may be considered." Here again the plate illustrations of plans form an important part of the work, showing the best practice in all types of modern English domestic architecture. The drawings for reproduction were furnished by some of the most prominent architects of the day. Taken independently of the text, the plans in the volume form a most valuable collection of examples of up-to-date English planning.

The remaining chapters of the work treat more fully some of the subjects suggested in the chapter entitled "The Enunciation of Broad Principles," one being on "Aspect and the Treatment of Windows." Aspect is a matter which should receive more careful attention than is usually accorded it. If the architect figured the amount and duration of sunlight that could enter the windows and would base the placing and direction of windows on knowledge gained in this way, many defects in window planning might be avoided. Other broad principles that are discussed in these chapters include "Privacy and Seclusion"; "Roominess, Furniture Requirements and Prospect"; "Grouping"; and "Acoustics." In this chapter on acoustics there are collected the views expressed by various writers on a problem which, after a century or more of investigation, remains unsolved. The following chapter is very important, as it deals with stairways, inclined planes and miscellaneous features. The discussion of "Economy" dwells on the increased difficulties that an architect experiences when freedom of planning is curtailed for the sake of lessening the expenditure. The final chapter discusses to a considerable extent the possibility of relating the plan and elevation advantageously by working them concurrently and thus correlating them.

THE PRINCIPLES OF PLANNING BUILDINGS. Fourth Edition. By Percy L. Marks. 117 Plates and 198 pp. 6 x 9 ins. B. T. Batsford, Ltd., London.



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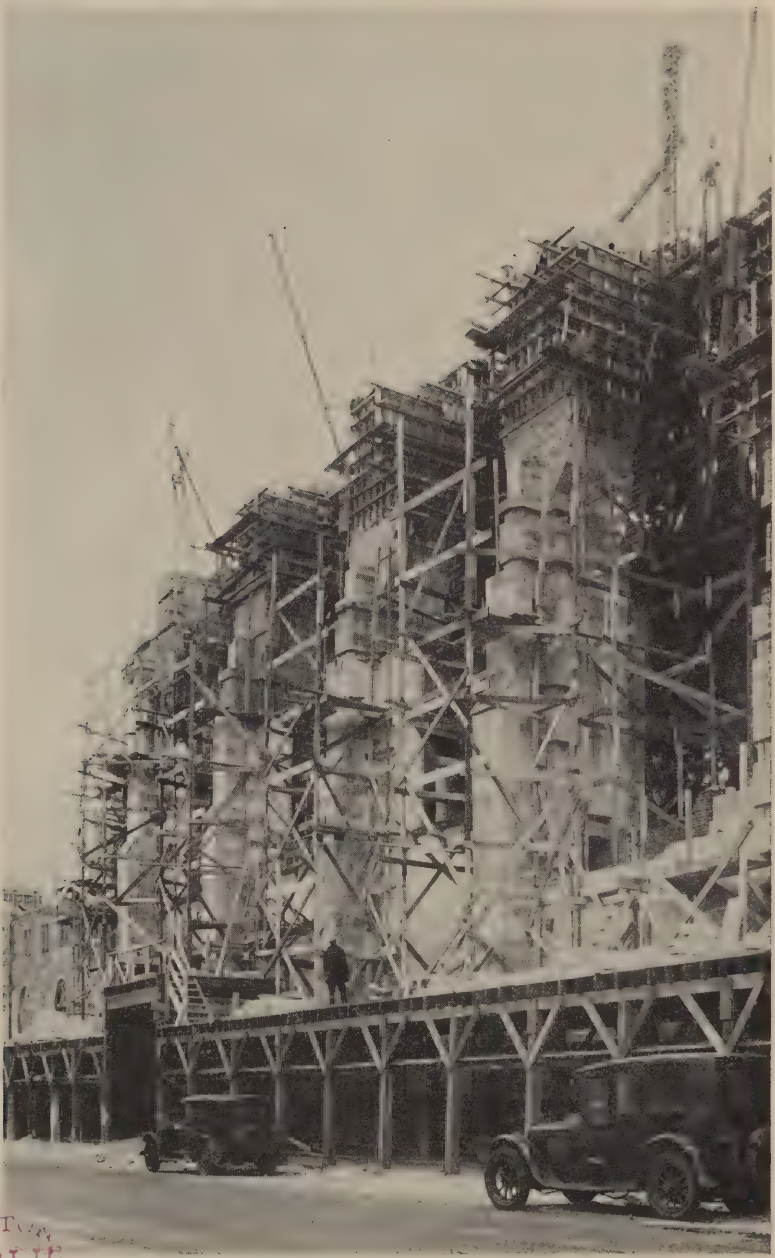

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THE
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VOLUME L NUMBER THREE
MARCH 1929

FINISHING MATERIALS AND METHODS IN CHURCH ARCHITECTURE

BY

BRUCE C. WENNER

CHURCH architecture demands special study and knowledge of materials for the finishing of the various sections of the building, just as much as it requires special study and knowledge of planning and designing. Church buildings should be especially beautiful. Refinement and dignity are essential, and care must be used in choosing materials which will be harmonious with the style of the building. Gothic, even if treated with modern feeling, must have the requirements of the style considered in the use of finishing materials. Durability and service, which mean low upkeep and small replacement costs, are very essential items to consider, especially in the selection of flooring and materials which will receive wear and tear. Most churches have a minimum amount of money to expend, and it is essential that they get the utmost in value for a given price. This makes it necessary that materials be economical in their cost and durable in their wearing qualities.

Since quiet is essential in a church, and since it is necessary that a speaker be heard easily, without echo interference, etc., either in the sanctuary, school section or in the entertainment room, materials which will aid in securing quiet and sound absorption generally should be considered. An acoustical analysis should always be made before the final plans and specifications are complete, since this may be quite a determining factor in the selection of finishes, especially for the church auditorium. Various materials for different uses will be considered here in their approximate order of cost, the most economical being given consideration first, though we are not endeavoring to cover all the possible materials or their uses.

Flooring

The Church Auditorium. First to be considered is material for use under pews. The flooring of the main portion of the church auditorium involves one of the most serious flooring problems for the whole church plant, for a material which is easily cleaned, economical, durable, and quiet under foot is needed. After having used various materials for this purpose, we find that one of the most economical and satisfactory floorings is wood. Selected oak makes an economical and pleasing floor, the better grades being desirable when funds permit. A waxing and polishing machine keeps the floor clean and in good condition. Cork carpet is often chosen for appearance and quiet. Linoleum and cork tile are excellent for this purpose. The use of an inexpensive grade of wood with a good carpet over it is very quiet and comfortable. Carpet also helps somewhat with acoustical correction, but it is not kept clean as easily as wood, and it is not as sanitary for a place of public assembly. Carpet is also expensive in first cost and requires comparatively frequent replacement.

Wood flooring should be put down over a heavy felt or other sound-deadening material. Linoleum, cork or cork carpet should be cemented down over felt by the manufacturer's authorized installation men. Waxing or varnishing these materials is a good method of preserving the appearance and finish, and it aids considerably in cleanliness. We usually recommend that shellac or oils never be used on finishing wood floors in churches. Paste filler, wax or floor varnish only should be used to secure a satisfactory floor.

Aisles, Narthex, Vestibules, Corridors, etc. The aisles of the church where cost is the determining factor may be floored with wood as has been suggested for the space under pews. A carpet runner down the aisle is often advisable for the wood floor, and this can easily be taken up for replacement or cleaning. Cork composition flooring materials can be used to advantage for aisles, chancel, corridors, etc., as they are pleasing in color, quiet, and harmonize well with most interior treatments. Rubber tile is a good material for flooring, but often the appropriation for the school section will not admit of its use. Quarry tile laid in some form of random ashlar with joints between tiles not over ½ inch wide makes a dignified aisle and vestibule treatment. Some small moulded or ceramic tile with ecclesiastical designs and color are interesting when interspersed here and there in the quarry tile field.

Lawndale M. E. Church, Philadelphia
Sundt & Wenner, Architects

The thing to be aimed for in this type of floor design should be interest and beauty, and the regular use of a square tile treatment with straight joints may be considered by some as being rather mechanical and severe. Terrazzo is useful for aisles, corridors, chancels, etc., especially when used with tile or mosaic tile, the terrazzo itself being used as a field and always laid with the use of brass strips to prevent cracks. Terrazzo should always be applied over a solid, rigid, structural concrete base.

One of the most satisfactory materials (and although we are considering it last, one of the most economical materials for church steps, vestibules, aisles, chancel, etc.) is slate. The use of mottled greens and purples with a moderately rough surface makes a non-slippery, beautiful floor. It is sanitary and quiet under foot and has durability and dignity. This type of floor can be laid very economically if so desired; slates of thinner roofing thickness can be used with success when thoroughly bedded in cement mortar. We generally use ¾-inch thick slates bedded in 2-inch cement mortar composed of three parts sand and one part Portland cement. After the surface of the cement is leveled up, it is sprinkled with pure Portland cement to perfect the bond between bed and slate. We thoroughly wet the slates before embedding and set them in firmly and to the desired level. Joints should be pointed with cement mortar of two parts well sieved sand and one part cement. We sponge off the slates as set with clean water, and upon completion, after the floor is finished and set, we rub down with three parts kerosene and one part of linseed oil well mixed.

Offices, Classrooms, Assembly Rooms, etc. For these rooms a wood floor is probably as satisfactory as any. Rugs can be added to give a comfortable and homelike appearance and to harmonize with draperies, wall finishes, etc. Linoleum, and various composition tile make a good floor finish for school and administration rooms. These materials are very good and economical for floor treatment over concrete floors in fireproof construction. The concrete floor can be finished smooth, and when strict economy is necessary the cement floor can be left as the finished floor for a time, and the floor finish can easily be applied as funds become available. Chairs and tables must be equipped for use on linoleum with proper castors or "shoes," since children using these furnishings are likely to give them rough treatment which may mar the floor.

Toilets, Locker Rooms, etc. For these areas a cement floor is probably most economical and can be given an attractive appearance with the use of integral coloring and hardener and the marking of the surface into squares. Magnesite composition flooring is adaptable for this purpose, and it is somewhat more resilient and less cold in appearance than concrete. A metal strip must be provided between this material and the plaster of side walls or it may stain the plaster. The magnesite floor must also be oiled or waxed, or water stains may result with certain colors. A tile finish for toilets, showers, etc., always seems to give the best results for both floors and walls. The new tile color treatments make possible a certain warmth and interest which was not possible with the use of white tile exclusively. The only disadvantage of this material when properly installed is its cost, and proper installation is essential to avoid there being loose tiles; an installation of tile work that is "cheap" is very unsatisfactory.

The Parish Hall and Gymnasium. The parish hall, fellowship hall or gymnasium,—by whatever name it may be known,—is frequently equipped with an oak, maple or gumwood floor. The latter material is likely to twist somewhat, but it comes in long length. A floor of edge grain yellow pine is satisfactory, but it may cost as much as oak. Select oak is economical and makes a good floor.

General Considerations. The construction under aisles, narthex, vestibules and corridors should be solid and firm so that there is no feeling of vibration when it is walked upon. It is very disconcerting and creates a bad psychological effect when one walks over a title or floor and hears a hollow sound or has the consciousness of there being movement or vibration, and a concrete slab should be used which is sufficiently thick and properly reinforced to prevent cracking and to make impossible the hollow sound when the floor is walked over. It is often an advantage to use a base of the same material as the floor for finish around the walls of a room. This is especially true in vestibules, halls, corridors, etc. Toilet rooms should have the floor material formed into a sanitary cove and base which should be high enough to protect the side walls from becoming soiled. This matter is sometimes governed by building codes, but when there are not definite regulations a good practice is to carry the base up for 15 inches upon the side walls.

Wall Treatments

Church Auditorium. The walls of the church auditorium, when strict economy must be observed can be treated simply with sand-float finish plaster tinted very slightly to a pale ivory or gray. For a building of the Colonial type this finish is in keeping with the style, and its use is perhaps the best solution of the problem. A Gothic church calls for more texture if the cost can be afforded. An "old English" treatment of the plaster is very interesting and in keeping with the architecture; a plasterer who is used to handling this finish can do it very reasonably. Textures which are suitable for cafes, hotel lobbies, etc., are not usually adaptable to church interiors, as the sanctuary needs a treatment quiet in color and texture. The auditorium may in some instances require the use of acoustical material on the side walls. Some such materials have a rather satisfactory texture for wall finish in their regular treatment; it is not always necessary, however, to require acoustical treatment on the walls of the church, since the ceiling treatment frequently takes care of this.

A church auditorium, when the amount of money to be spent warrants it, can be treated with variegated limestone or a cast stone veneer. Sandstone makes a very warm and beautiful interior, but it is somewhat expensive. When stone interior walls are used, care should be taken to get as much warmth into the interior as possible, through the use of warm glass in the windows and warm treatments elsewhere. In the more liturgical churches it may be permissible to have a colder interior than in the evangelical churches, but we do not feel that a cold interior is ever really desirable or inspirational. There are a number of possibilities in the use of slate, mosaic, marble, etc. for the decoration of walls, but as the use of these is largely a matter of design, they will not be considered here. The use of wainscots of wood or stone is good practice, and radiators or concealed heaters can be arranged behind the wainscot having the heat openings designed to tie in with the design and thus be as unobtrusive as possible. The use of paint on new church walls is rather unnecessary unless one of the patent textured wall finishes is used instead of the usual final coat of plaster. Old walls can be refinished to great advantage with this type of material. The use of some carefully placed and well designed painted decoration is permissible and desirable in certain cases.

Trainer M. E. Church, Trainer, Pa.
Sundt & Wenner, Architects

Organ Chambers. The walls and ceiling of the organ chamber should be plastered with Keene's cement troweled to a hard, smooth surface. Some organ builders prefer wood, but this material is not as vermin-proof or as fireproof as plaster, and some of the organs with the finest tones have been installed in plastered chambers.

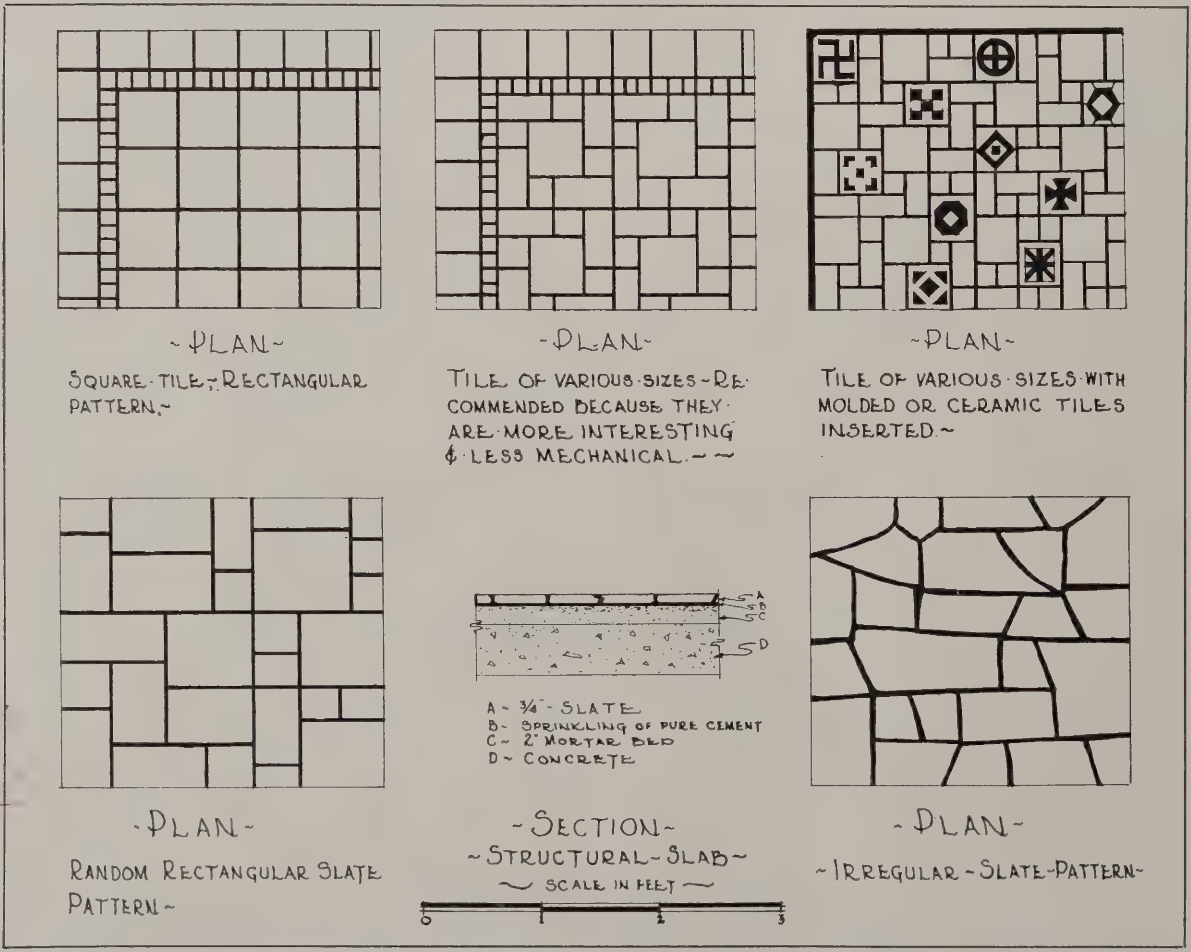
School Rooms, Administration, Parlors, etc. The schoolrooms can be treated with simplicity to advantage, and usually this is necessary, since this portion of the work while being important and requiring good materials and finish must also be economically handled. Sand-float finish plaster with light tinting is very adaptable. If possible, painting in these rooms is recommended, and this should be done with flat wall finish of shades rather neutral and delicate in character. Sunny rooms can have a cool color treatment, while rooms which do not receive sun should have a warmer tone. Church parlors, lobbies, reception rooms, etc. can be treated with textured surfaces, and other materials such as wood paneling, etc. which will aid in carrying out the design and decorative effect are often desired. When the financial resources warrant it, these rooms should have a rich finish and should be made as attractive, intimate, inviting and comfortable as possible.

A chair rail is essential in the various rooms of the Sunday School, and the rooms for the younger children should be arranged to have a band of cork from 12 inches to 18 inches wide run around the room for the exhibition of pictures, handiwork, etc. All class and assembly rooms should have blackboards with cork panels at the sides or tops for use in exhibiting illustrations or posting notices. Definite study of the decorative treatment of the various school department rooms, club and classrooms, parlors, etc. is essential. The architect should, wherever possible, suggest the color schemes, help select rugs, furniture and draperies, as the importance of this in making the rooms of the school beautiful, homelike, comfortable and inspirational cannot be overestimated. Varnish which finishes with a flat surface is preferable to shining wood finishes.

Toilet Rooms, etc. These should either be tiled as discussed under "Flooring" or have a hard plaster wall finish of Keene's cement troweled smooth and hard and then painted with a hard-drying enamel capable of being washed. This treatment should be used at least 4 feet, 6 inches or 5 feet high and preferably over the entire wall surface. Toilet partitions, shower stalls, etc., may be of metal with baked-on enamel finish. The use of wood stalls is to be discouraged for sanitary reasons. Slate or marble are of course excellent for this purpose, but they are likely to be too costly as well as being subject to breakage, cracking, etc., when subjected to hard, careless usage.

Parish Hall or Gymnasium. It is usually economical and advisable in the modern church plant to have one room which will serve for gymnasium, entertainment room, banquet hall, etc. A separate gymnasium is sometimes desirable and possible, but the money available for the building fund often makes it absolutely necessary to double up functions so that one large hall will serve for many purposes.

In a small church the hall may be successfully lined with wood. A paneled wainscot stained to a darker tone can be used below with "German


~PLAN~
SQUARE·TILE~RECTANGULAR PATTERN~
~PLAN~
TILE OF VARIOUS·SIZES~RECOMMENDED BECAUSE THEY·ARE·MORE INTERESTING & LESS MECHANICAL~~
~PLAN~
TILE OF VARIOUS·SIZES·WITH MOLDED OR CERAMIC TILES INSERTED~
A
B
C
D
A ~ 3/4" - SLATE
B ~ SPRINKLING OF PURE CEMENT
C ~ 2" MORTAR BED
D ~ CONCRETE
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RANDOM RECTANGULAR SLATE PATTERN~
~SECTION~
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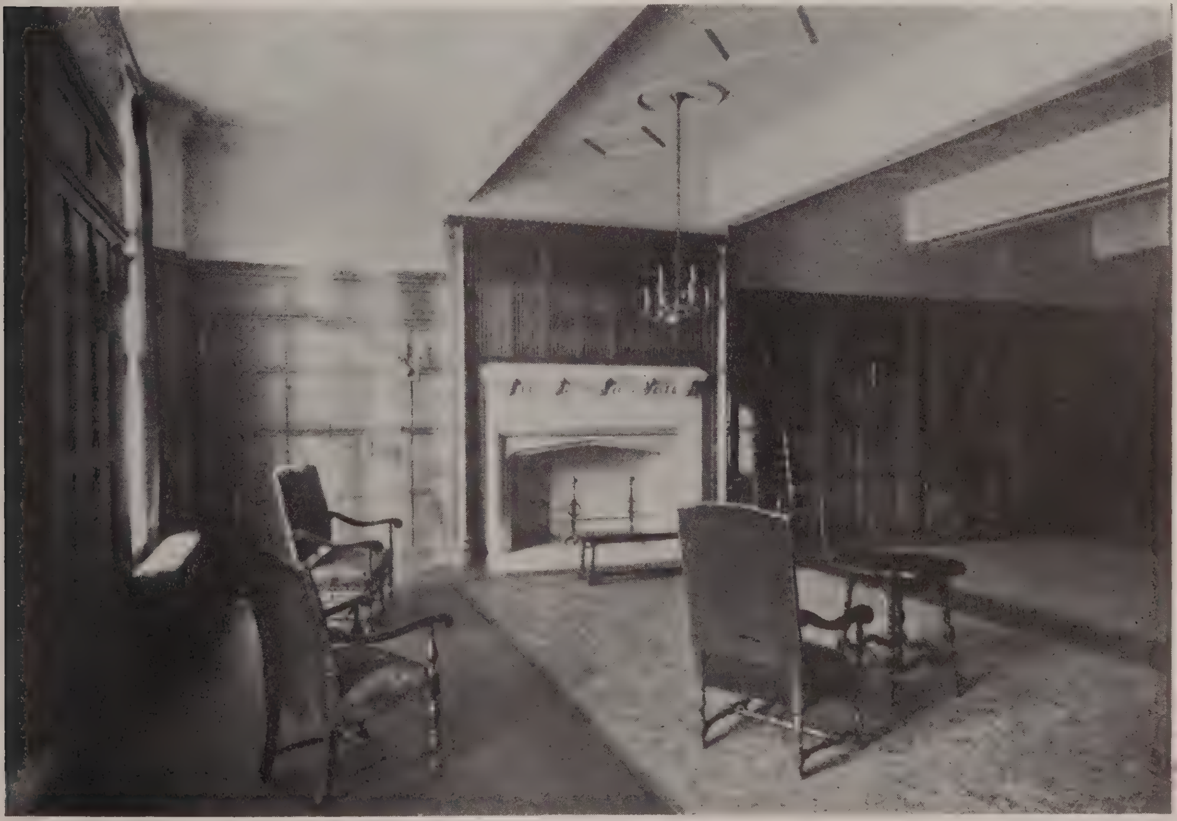
~IRREGULAR~SLATE~PATTERN~

Various Types of Tile and Slate Flooring siding," V-jointed boards, or other similar material above stained a light gray or some other light color. With some ingenuity this can be worked up into a very attractive, durable and reasonable finish. Jointing in the wainscot might be run vertically with a flat moulding treatment developed at the top of the wainscot, and the upper surfacing can have the joints run horizontally. Various other treatments are possible. In larger buildings a good treatment for the parish hall is obtained with brick of a light, warm tone with at least some range of color. Bands of headers, upright stretchers, etc. can be worked in, giving interest and pattern to this type of wall. If the proscenium arch of the stage is treated with a paneled and moulded wood casing, the severity of the brick is somewhat softened. Incidentally, we might mention that the stage front should have removable panels, and space can be provided beneath the stage floor for the storage of tables and chairs. These can be stacked on flat trucks with rollers which can very readily be pushed under the stage for storage. The parish hall may be plastered, but if it is used for gymnasium purposes plaster is not very durable unless cement plaster is used applied over furring tile instead of over lath. Of course where a separate gymnasium is planned or where the hall is to be used for nothing but assemblies, entertainments or suppers, a plaster treatment is satisfactory, especially when either a brick or wood wainscot is installed. The plaster can then be finished with any texture or surface desired to give the preferred treatment.

Ceiling Treatments

The Church Auditorium. The church ceiling treatment depends largely on the type of its architecture. If the Colonial style is used, the ceiling will probably be plaster, and in most instances coved. This type of ceiling usually requires the use of an acoustical plaster if the radius is not over twice the height of the room, and if it is desired to reduce the sounds from the congregation. An auditorium of this type without acoustical treatment may be satisfactory for the transmission of the speaker's voice, but the turning of pages of hymn books as well as the sounds of movements of the congregation is magnified to the point of annoyance. Acoustical plaster is satisfactory for this problem, and can be used to make a satisfactory architectural treatment. In the Gothic church usually very little acoustical treatment is needed, especially if it is of the clerestory type with which are included side aisles.

The ceilings of the side aisles need treatment more than any other portion of the auditorium,



Church Parlor. Oak Paneling, Textured Plaster Walls, Plaster Ceiling with Ornament in the Tudor Style

Classroom, Elm Park M. E. Church, Scranton
Albert N. Dobbins, Architect

Assembly Room, Elm Park M. E. Church, Scranton
Albert N. Dobbins, Architect

as a rule. An acoustical expert should analyze each project to check up on the kind and amount of material necessary to give the proper correction of echoes and absorption. Acoustical material can be used on ceiling panels between trusses and purlins. Our experience has been that a church auditorium with narrow nave, not over 38 feet wide, and side aisles of about 4 feet can be made very successful by the use of a wood ceiling which of course is really the most satisfactory thing for appearance in a Gothic church, unless vaulting of proper design can be used. We would not recommend the use of plaster vaulting, since this is a false use of this material. We include here an illustration of a church at Lawndale, Pa. which has an acoustically treated ceiling. This church is practically perfect in its acoustical properties. Some sound-absorbing materials are not very satisfactory in appearance for a church ceiling, but if properly stained this fault may be corrected in part. We are using cork about 1½ inches thick to advantage, and the appearance of this material in the ceiling panels is frequently very pleasing. All these materials are not only sufficient as a rule to correct the acoustical difficulties of most churches, but they provide insulation for the open timber roofs and make expensive false ceiling construction unnecessary. A vaulted ceiling can be built with acoustical tile when necessary, but real stone or cast stone gives a better result for appearance. The chancel ceiling should not receive acoustical treatment.

Vestibules, Narthex, Parlors, etc. The ceiling treatments for these may be plaster with an arched treatment, moulded work, etc. The use of wood beamed ceilings for these spaces is also very good. Adzed timbers left in their natural state or decorated in colors, stenciling, etc., help to make attractive ceiling treatments for smaller rooms. The main vestibule, narthex and church parlors, or reception room especially, deserve interesting and detailed ceiling treatment suitable and adaptable to the architecture and requirements of the various rooms and their functions.

Schoolrooms. The ceilings of schoolrooms are usually treated with smooth, white plaster for efficient lighting, economy and sanitary conditions.

Parish Hall. In fireproof construction an exposed concrete ceiling is very adaptable for this room, especially when it is used for gymnasium purposes. The concrete is capable of being stained or painted, the form marks of wooden forms being left to show. All fins and honeycombing should of course be removed and smoothed up. Also by the use of wire brushing a certain texture can be secured. Where the ceiling is high enough, plaster can be used. Smooth white plasters give the best lighting results, but a sand finish with a light buff tint usually gives the most pleasing results with brick.

A decided effort should be put forth to secure the use of good materials of durable and artistic qualities for church use. The American people are guilty of using very cheap and shoddy church construction. There is no type of public building that has been done quite as carelessly and cheaply as the church during the last 50 years. We need very strenuously to counteract the use of shoddy treatments and interiors of church buildings in color schemes and decorations, furnishings, etc. The architect must endeavor to educate the committee and congregation; he must safeguard them against allowing untrained persons to select floor coverings, colors for walls, furniture, lighting fixtures, and other decorative equipment. The "Ladies' Aid" means well, but usually its members have had very meager artistic training. It is the architect's duty to try to direct the furnishing and decorating of the entire church plant, and it is also his duty to familiarize himself with the latest approved methods and requirements for church and school usage as set forth by the church at large so that he can intelligently advise the local church as to what it should have.

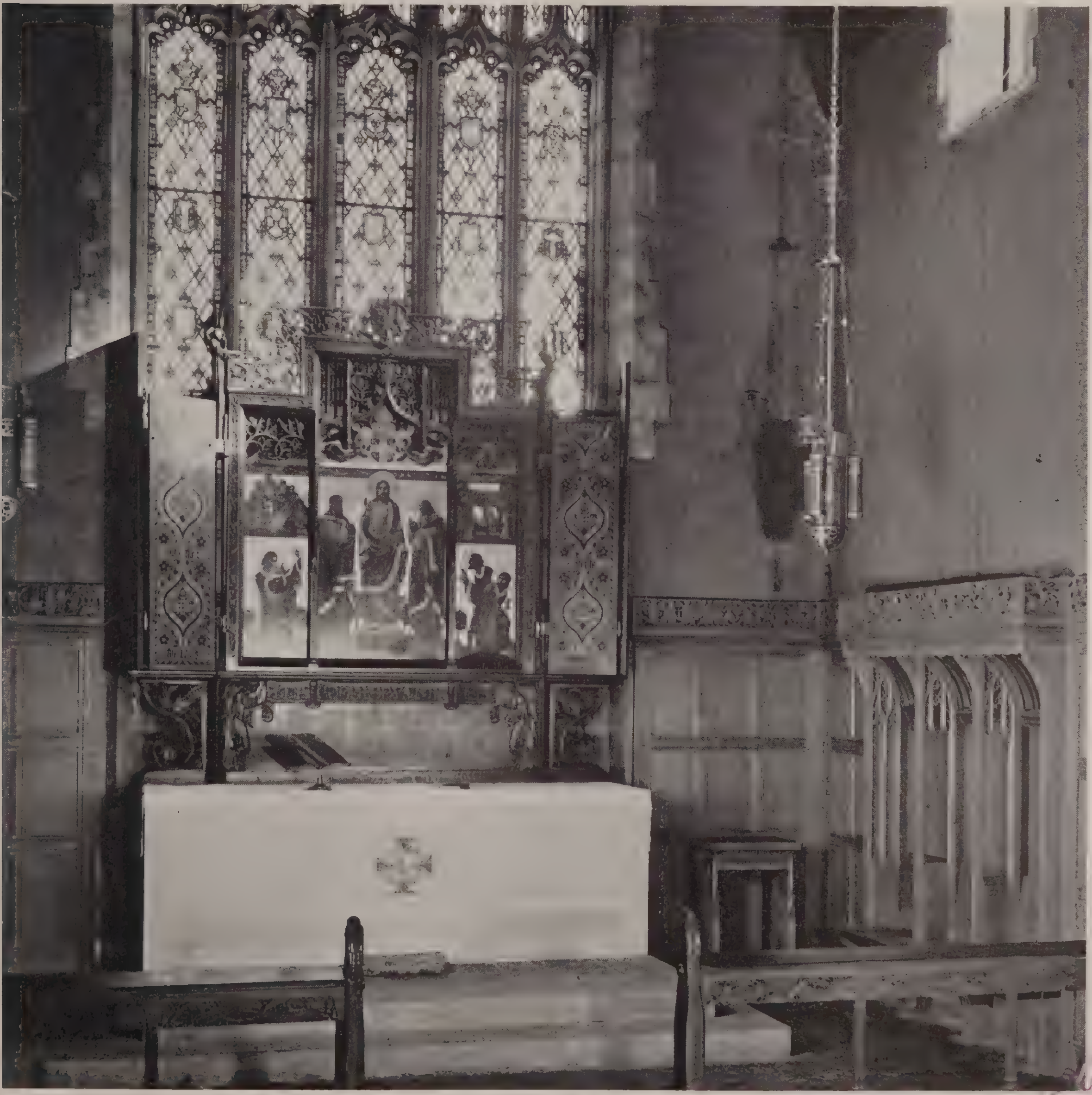
THE CARVING OF A CHANCEL CRESTING

BY

THEODOR CARL MULLER

The history of the Episcopal Church, from its inception to the present day, reduced to the pictorial limitations of carving in oak forty-three feet long, seven inches high, and one and one-eighth inches deep, might shock some scholars, but has delighted all concerned with this reduction. In thirty-one chronological scenes it became the chancel cresting illustrated. To the right of the altar are incidents relative to English Church history, and those to the left relate to Church history in America beginning with Raleigh's colonies.

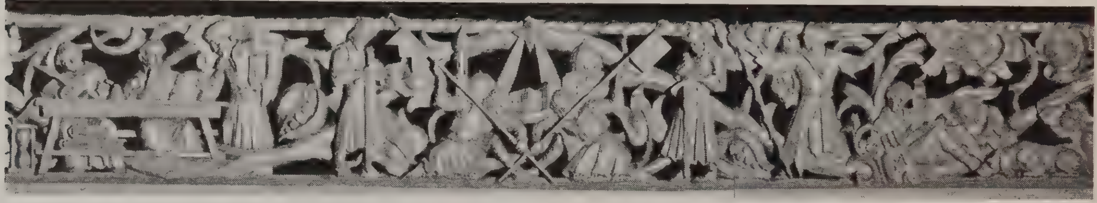
Beside the unity of time sequence there is only that of relative variance, each scene expressing an element in the life of the Church peculiar to itself. This is an exponent of Gothic idea, which appraises worth by that which the individual alone expresses, as opposed to an appraisal on a basis of approach to the ideal. Arbitrary and traditional conventions and symbols have been used throughout to simplify illustration, to wit: three are a crowd and where dominated by a single idea these three are alike. Elsewhere they may differ.



Chancel of St. Mark's Church, Mt. Kisco, N. Y., Showing the Cresting

Cram, Goodhue & Ferguson, Architects
Mayers, Murray & Phillip, Architects of the Additions

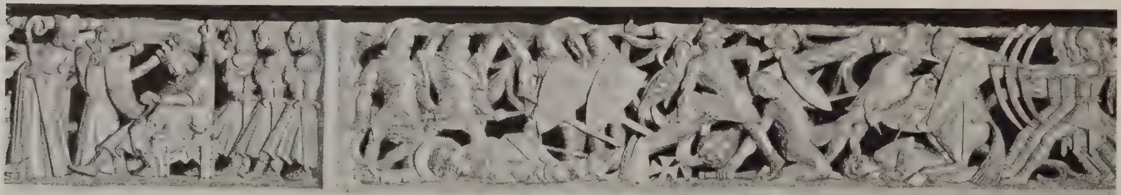
CHANCEL CRESTING, ST. MARK'S CHURCH, MT. KISCO, N. Y.



John Wycliffe and the Bible, 1384. Wycliffe was the first English scholar to repudiate Rome.

The Crusades, 1096-1271. The knights are shown worshiping at the shrine of their religion.

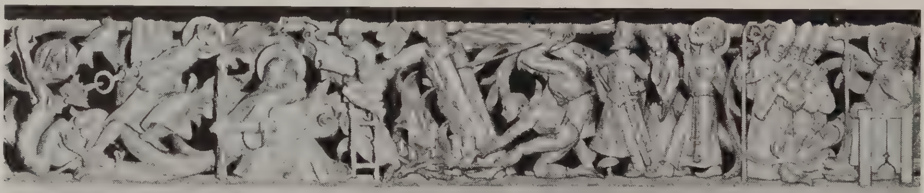
The Mendicant Friars. In the 13th-14th centuries, England was full of mendicant monks.



The Magna Charta, 1215. Among other things, this guaranteed political and personal liberty in England. Signed by King John.

Martyrdom of St. Thomas a Becket, 1170. Henry II instigated the murder of this "upstart priest" in Canterbury Cathedral.

The Battle of Hastings (or Senlac), 1066. The Norman cavalry and archers are shown in pursuit of the English peasants.

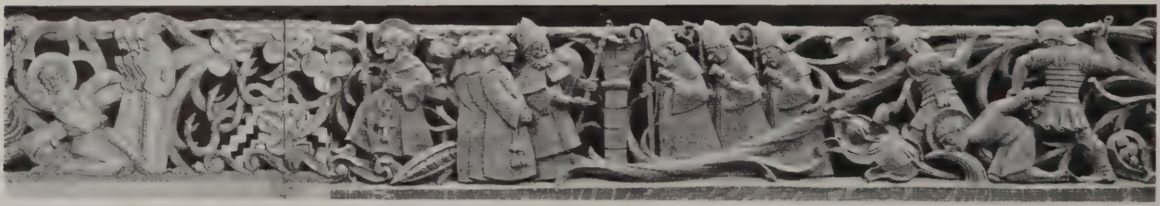


St. Dunstan, A. D. 950, a monk of some musical ability, at Glastonbury, was tempted by the devil in the guise of a woman. When seized with tongs, the devil reverted to his usual shape.

Bede, called the Venerable, A. D. 735. Bede was eminent in learning and piety, translated the Gospels into English. He died dictating the last of St. John to a young scribe.

Paulinus and the destruction of the Druidic shrine, A. D. 625. Paulinus was a missionary sent from Rome to assist Augustine. He is shown accompanying a Christian princess.

St. Augustine and the Bishops, A. D. 604. St. Augustine was sent by Pope Gregory as a bishop to England; called a conference of the bishops, receiving them seated.

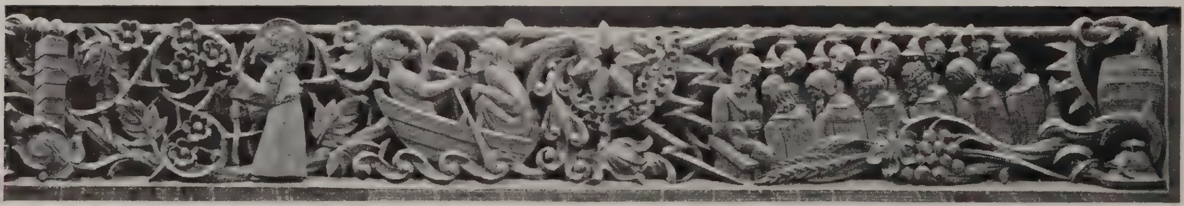


St. Colomba, A. D. 520, an Irish scholar and priest, founded many monasteries in Ireland and Britain.

St. Patrick was carried as a captive to Ireland, which he evangelized. Called the "Apostle of Ireland".

Council of Arles, A. D. 314. The three English bishops were those of York, London and Lincoln.

St. Alban, A. D. 305, was the first saint and martyr in England. He prayed and a stream gushed forth.

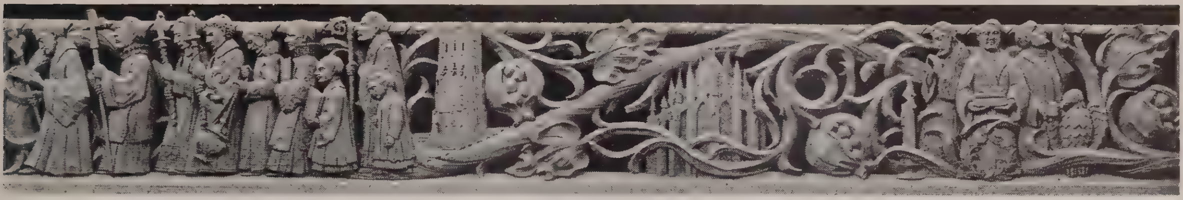


The First Man to Bring the Gospel to England. St. Paul, St. James and Joseph of Arimathea are each mentioned as being the first to preach.

Joseph of Arimathea and the Glastonbury Thorn. Joseph was sent to Britain. At Glastonbury, he thrust his staff into the ground and it budded.

Pentecost, called the Birthday of the Church, which is set forth in Acts II. vs. 1 through 4. Also sometimes called "Whitsun-day."

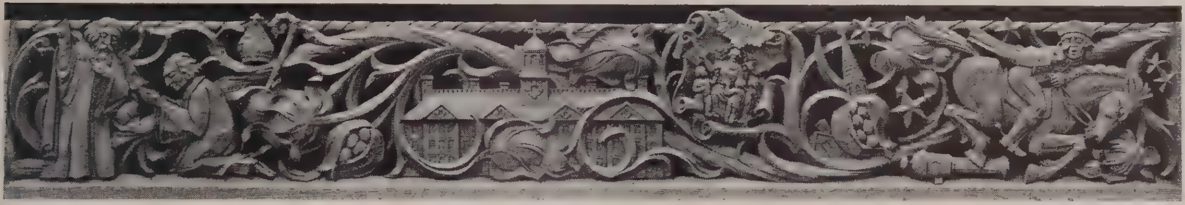
CHANCEL CRESTING, ST. MARK'S CHURCH, MT. KISCO, N. Y.



The Church Today. The subject of the final panel, from which we start to retrace the history of the Anglican Church, is the symbolic procession of the Church onward.

The Cathedral Era. Washington Cathedral is on the right and Baltimore Cathedral is on the left, although the tower of the Baltimore Cathedral is not yet built.

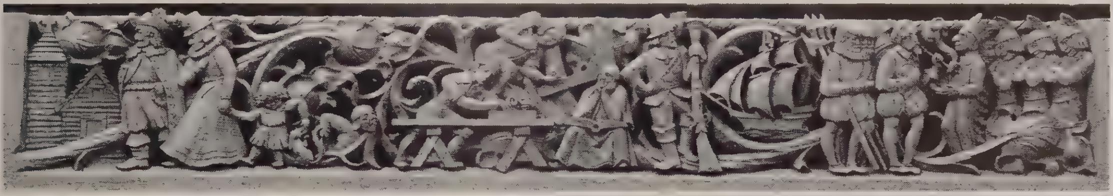
High, Broad and Low. This is an attempt to symbolize arbitrarily the three trends in the interpretation of the Church's doctrine, commonly known as High, Broad and Low.



The First American Bishop, 1784. Dr. Samuel Seabury, the first American bishop, was consecrated in England.

King's College. Chartered in 1754, the College, now Columbia University, is shown at the close of the eighteenth century.

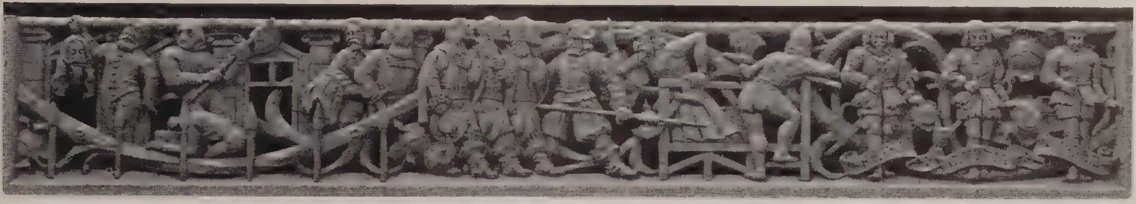
Paul Revere, 1776. He was maker of church bells and one of the earliest designers of ecclesiastical silver in America.



The Settlement at Jamestown, 1607. One of the first English colonies to be permanent in America; survived under the able leadership of Captain John Smith.

Popham's Colony, 1607, Kennebec, Me. The surviving settlers became discouraged and returned to England in a ship they had built during the winter.

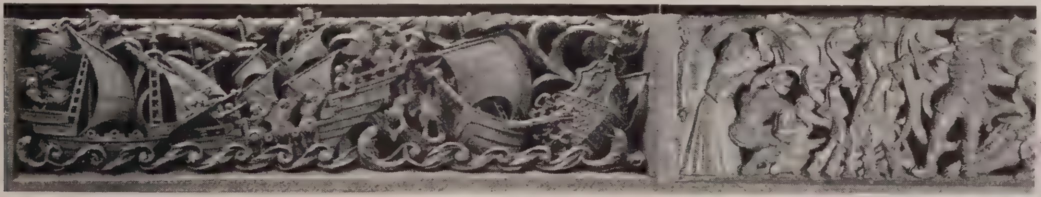
Sir Walter Raleigh, 1585-1590. Several groups of colonists were sent out from England under the direction of Raleigh, during the years 1585-1590.



The Beheading of King Charles, 1649. He refused to accept the Covenant, which abolished the episcopate and disendowed the Church of England, and was condemned to die.

The Beheading of Laud, 1645. Bishop Laud was harsh and domineering in his effort to enforce reverence by regulation. He was convicted of high treason. He died preaching.

The Tale of a Tub, by Jonathan Swift, is a parable of the Reformation, indicating the divisions and the excesses into which the Church had fallen in interpreting the Bible.



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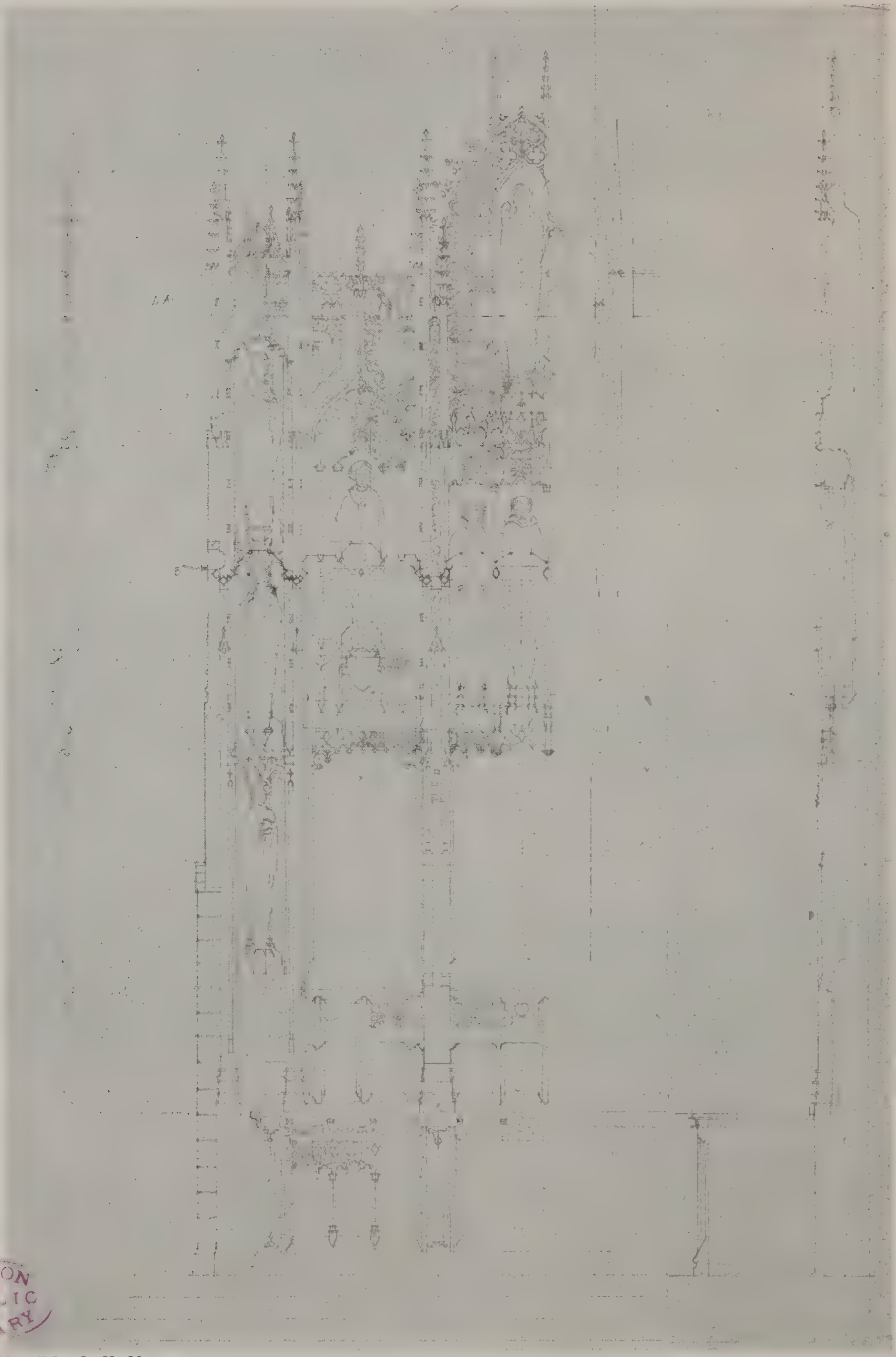
The Defeat of the Spanish Armada, 1588. English vessels defeated the Spanish, and furthered the separation of the English and Catholic Churches.

Martyrdom of Cranmer, 1556, Archbishop of Canterbury. He died holding in the flames his hand, which had signed a recantation.



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Detail by O. H. Murray

WORKING DRAWING FOR THE ALTAR AND REREDOS
CHRIST CHURCH, CRANBROOK, MICH.
MAYERS, MURRAY & PHILLIP, ARCHITECTS

CHURCH WOODWORK

BY

A. GORDON LORIMER

WOOD, as a constructive and decorative medium, has had an honored position among building materials in all ages and styles, but it is to the Gothic period that we must turn for woodwork in its most lavish and imaginative form. Many a humble little parish church in England owes its charm to the rich delicacy of its rood screens and chancel fittings, while in the larger churches and cathedrals, the stalls, tabernacle work, etc., are marvels of airy delicacy and splendor.

During the "Gothic revival" of the last century, much was written on the subject of church woodwork and many valuable records were made of surviving examples. The impulse of this movement, however, was literary rather than architectural, and it failed because "though rich in scholarship, it lacked in imagination." These efforts were expended mainly on a hard and fast classification of distinct periods and styles in existing work, to be used in conjunction with rigorously correct "period" churches. Fortunately the unimaginative archæology of the last century has gone,—we hope forever,—and in its place has come analysis of the essentials of the composition and the use of ornament only where the eye requires it to give full expression to the composition. "Decoration is the ritual of architecture,—it should emphasize, and not obscure the principles it seeks to glorify." Apart from its utilitarian aspect, woodwork serves a very necessary purpose in giving "human scale" to the church. The finer details and warmth of the woodwork constitute a foil to the impersonal masses of soaring masonry.

Timber Porches. On approaching the church, the first glimpse of woodwork is often found on the porch. Many parish churches of the fourteenth century have delightful open timber porches, giving that gradual transition from the open air to the interior which is so valuable architecturally. It is surprising that more use is not made of this feature in the churches of smaller American communities. Heavy barge boards with sturdy carving and overhanging eaves are features of this type of porch, which is essentially rural in character.

Exterior doors have been treated in a great variety of ways,—plain boarding, frames and boarding, bound paneling of all types, etc. Probably the most economical and satisfying type of exterior door is that of flush jointed oak boarding on a built-up core, with a studied arrangement of bolts, hinges, and other hardware of a decorative type, for which the plain oak surface provides an excellent background.

Narthex and Gallery. The narthex is usually low ceilinged because of the gallery above. There we have through the glazed and traceried screen a partial view of the church. This arrangement, in addition to giving the extra accommodation of the gallery, makes the passage into the church more gradual and renders the height of the church all the more impressive. The old rood lofts and screens of English west country churches afford an inexhaustible fount of inspiration for the design of narthex screens. In direct contrast to this convenient arrangement, the great overhanging side galleries which were introduced into churches following the Reformation, are nothing short of calamities. They break the height of the church in a most unfortunate manner, making it appear squat and uninspiring.

Roofs. Passing from the narthex, the eye is cast upwards toward the roof. Except in large churches and cathedrals, where stone vaulting was used, the roof was generally of wood, often complex in form and rich in gold and color. The restful yet rich combination of natural wood and applied color ornament has become so valued that in our large cities, where timber roofs are prohibited, one finds concrete roofs designed in timber form and decorated as such. The wood roof of St. John's Church, Buffalo, is an excellent example of simplicity in form and richness in texture, the gleam of gold on the edges of the trusses giving just the right note of interest to the dark timber. A good example of the more elaborate Westminster Hall type of hammer-beam truss may be seen in the Graduate Hall of Princeton University. A modern timber roof of great possibilities which has already been used with considerable effect in European churches, is that of a comparatively new type, shown in the chapel illustrated on page 438. This is exceedingly economical, being built from short lengths of light timber, the net-like mesh construction being tied in joints by bolts and washers. Though built of small units, this roof has great unity of form, which gives it dignity and repose. The Gothic arch, or hinged roof, the segmental arch, and the broach roof are the most common forms of this construction.

Pews and Seating. Whether built-in wooden pews or movable individual chairs are most convenient for the average church is an open question. Chairs give a greater sense of spaciousness, as the floor surface is visible throughout, while on the other hand, pews afford more privacy. At one time the Anglican Church published rules definitely limiting the measure of comfort with which pews could be endowed, but these rules

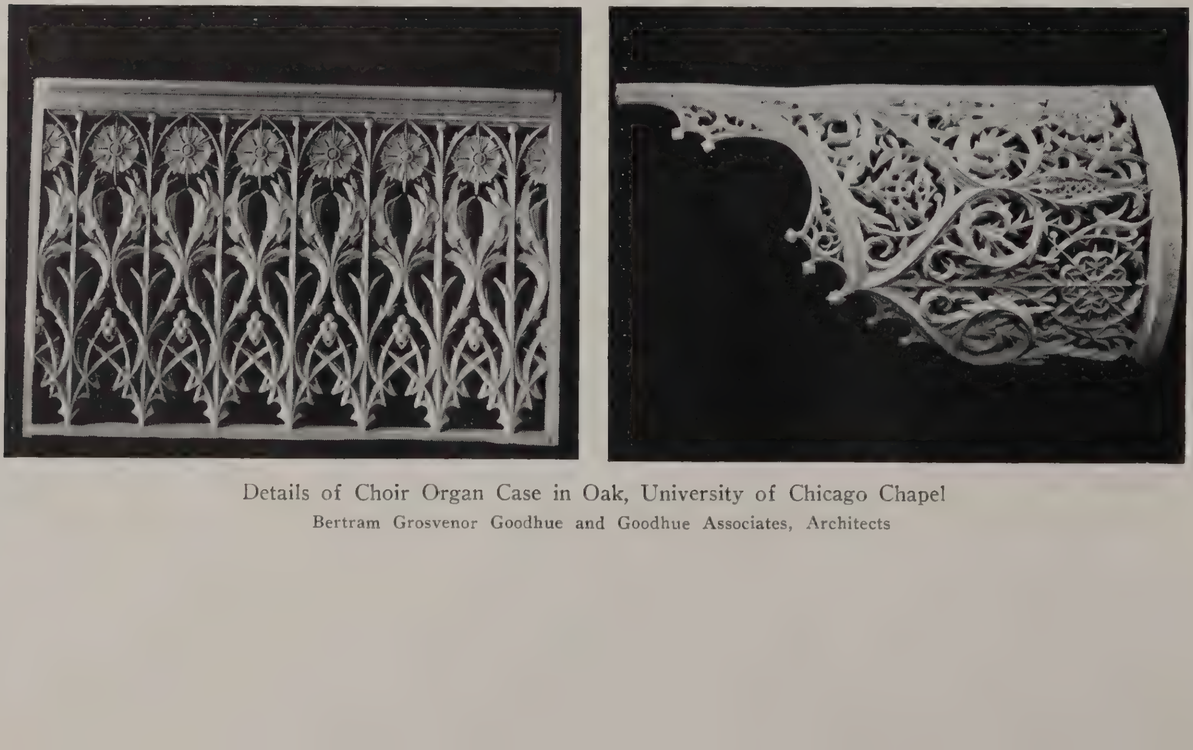
St. John's Church, Buffalo
Mayers, Murray & Phillip, Architects

Choir Organ, Chapel, University of Chicago
Mayers, Murray & Phillip, Architects

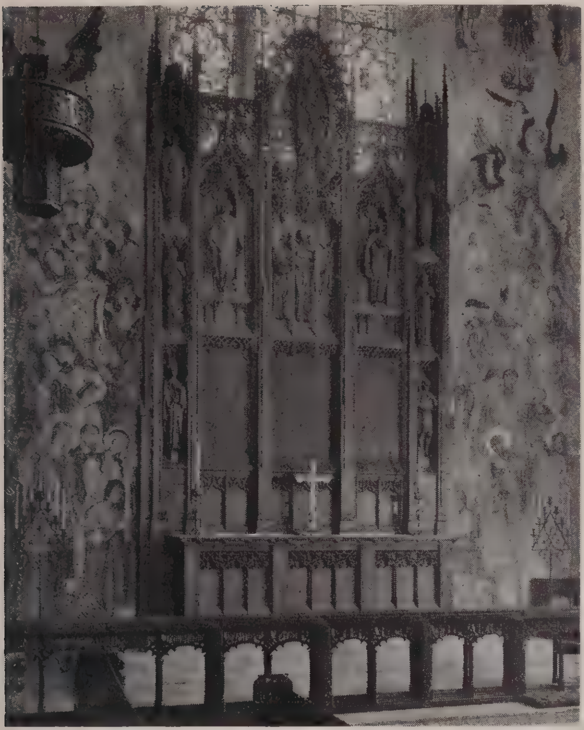
have fallen into abeyance. Elsewhere in this article will be found data giving dimensions which have proved comfortable without departing radically from traditional appearance. The dimensions allow of the use of a 2-inch cushion, which should be of a quiet, neutral colored, serviceable material. Book racks or receptacles are best kept sufficiently low, so that books, etc., are not visible in a general view of the church.

So far our imaginary church might belong to almost any religious body. Space does not permit of a full discussion of the various types of chancels adopted by the many denominations of today. The Anglican or Episcopal plan expresses fully and clearly basic principles of design in a place of worship and will well repay careful study. The plan illustrated is a fairly typical layout for a church of medium size. The traditional orientation has been taken throughout, the nave running east and west with the chancel and altar at the east end.

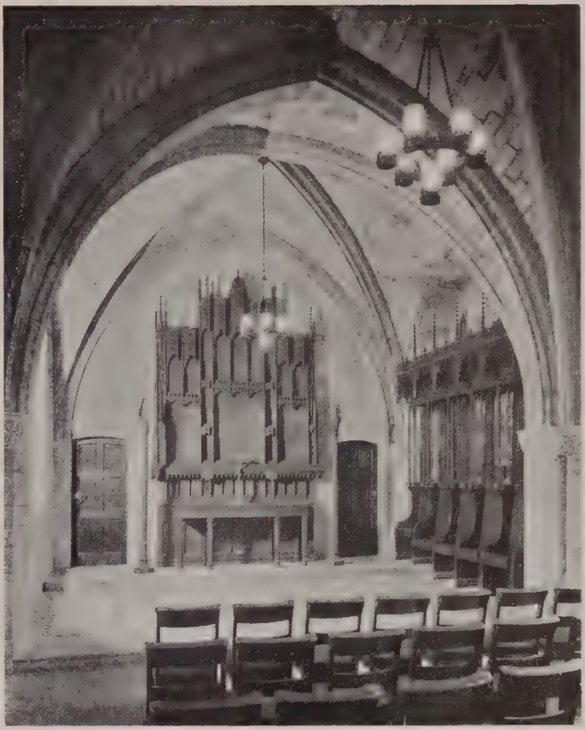
The chancel is separated from the nave by two or three wide steps, from 5 inches to 6 inches in height. This gives a better view and enables the



Details of Choir Organ Case in Oak, University of Chicago Chapel
Bertram Grosvenor Goodhue and Goodhue Associates, Architects



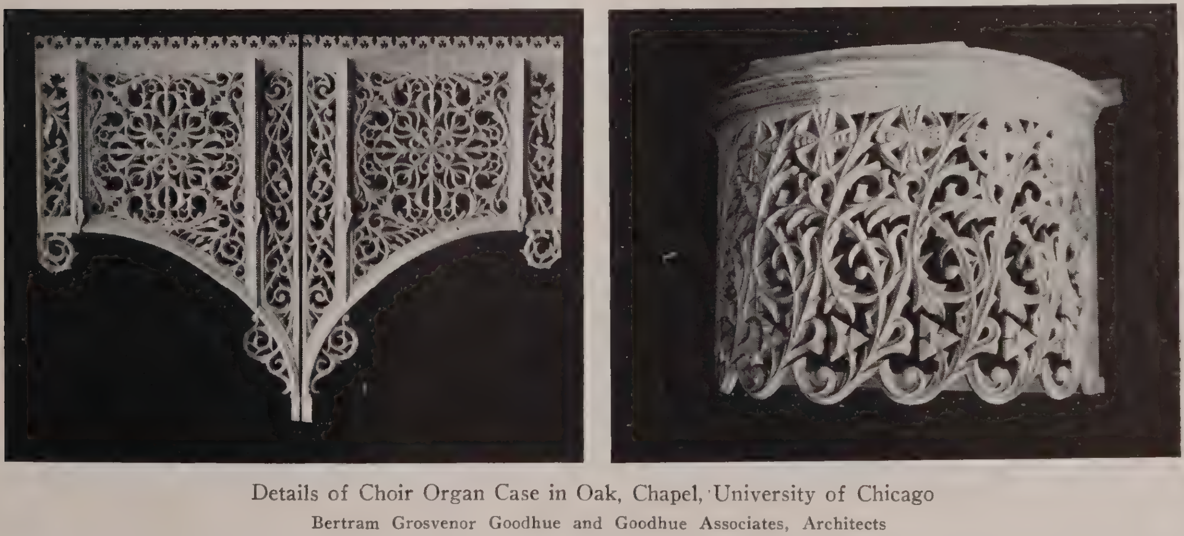
Altar and Reredos, Christ Church, Cranbrook, Mich.
Mayers, Murray & Phillip, Architects



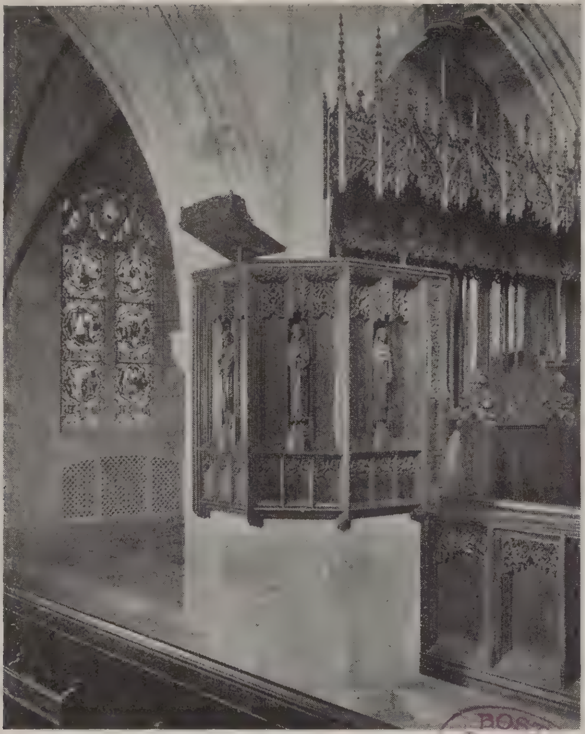
Chapel, Christ Church, Cranbrook, Mich.
Mayers, Murray & Phillip, Architects

clergy to be more clearly heard. It is desirable that these steps project into the nave rather than being recessed into the choir. A space at least the width of the center aisle should be left between the chancel steps and the nave seats. These steps run the full width of the open space between the front bookrests on either side of the choir, the remaining portion on either side being screened by a parapet of stone, marble or wood. This should be a solid screen to hide the feet of the clergy and choir, but should allow a good view of the chancel from the nave. A height of 2 feet, 6 inches from the chancel floor is generally adequate.

The Pulpit. There are no absolutely fixed liturgical positions for pulpit and lectern, but generally they are found just in front of the parapet on opposite sides of the chancel. Ecclesiologists long held the opinion that the only correct position for the pulpit was on the north or gospel side of the nave. This has been proved erroneous, and abundant precedent exists for placing it on the south side. It was not until the fifteenth century that use of pulpits became general. Many of these old pulpits are of exquisite proportions. This is due



Details of Choir Organ Case in Oak, Chapel, University of Chicago
Bertram Grosvenor Goodhue and Goodhue Associates, Architects



Pulpit and Corner of Choir, Christ Church, Cranbrook, Mich.

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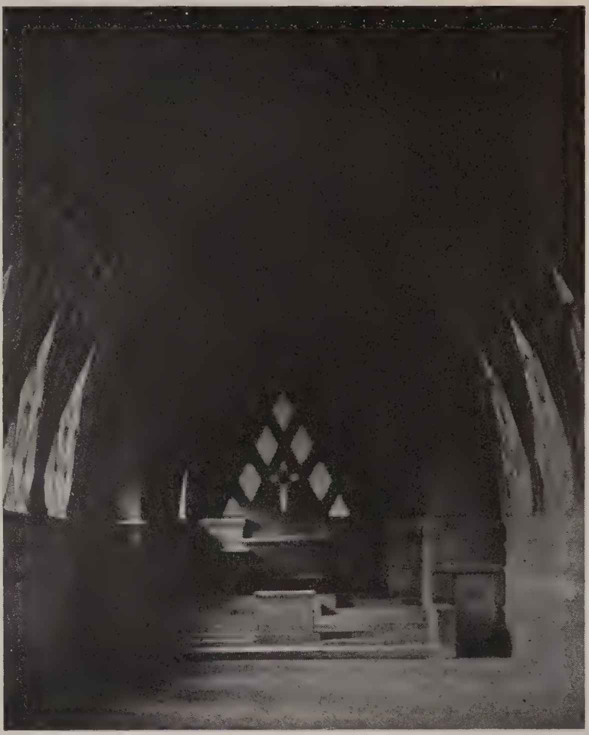
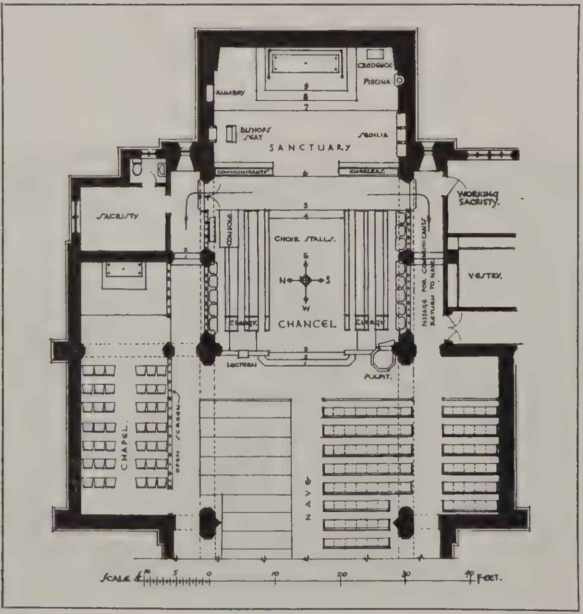


A Modern Timber Roof Built Up of Short Lengths Giving a Diamond Pattern

to their small internal dimensions, some of them being no more than 2 feet in their internal diameters. Rarely is the floor less than 4 feet above the nave, and it is often considerably more, one at Coventry, England, attaining a height of 7 feet, 6 inches. Concealed steps to the pulpit may save embarrassment. Steps should always be completely outside the diameter of the pulpit floor.

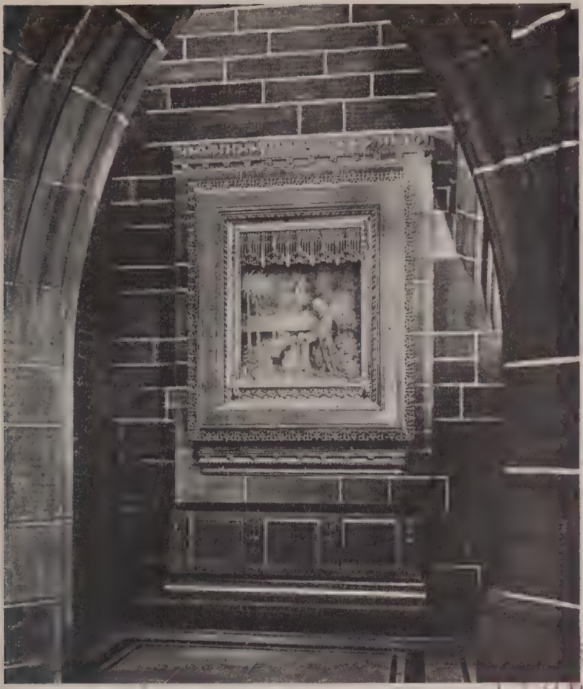


Typical Episcopal Chancel Plan, Showing Arrangement of Furnishings

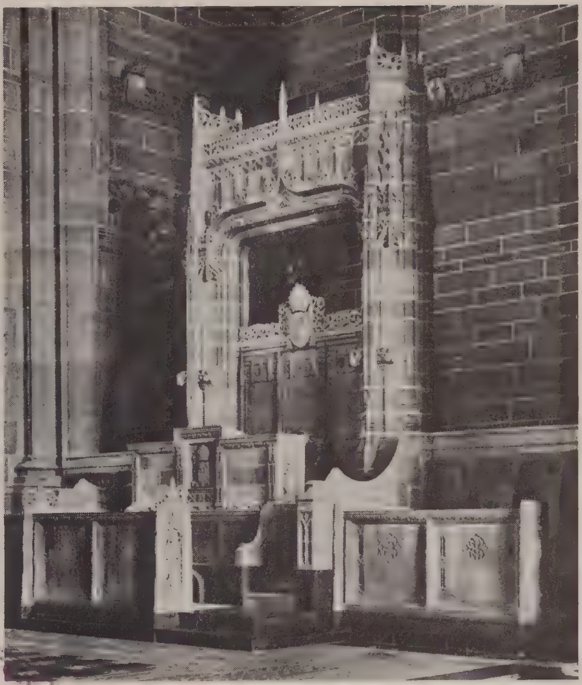
With the large internal dimensions desired by modern preachers it is extremely difficult to design a pulpit of pleasing outline. A happy solution has been found at Christ Church, Cranbrook, Mich., where a sturdy stone base carries the wooden pulpit rail. The plain surface of the stonework forms an effective contrast to the richness and delicacy of the upper woodwork. Another interesting feature is the decorative band along the edge of the bookrest, concealing a striplight and acousticon microphone.

Lecterns. The gospel lectern, or lectern from which the lessons are read, may stand in any convenient place in the chancel, the rubrics merely ordering that the reader should so stand "as he may best be heard." The reader should stand on a reading platform at least 1 foot above the nave floor and should not be on a level lower than the floor of the chancel. The desk should be adjustable and of such a height that it does not come between the reader's head and the congregation. Sometimes the carriage for the desk is built as an integral part of the parapet. In almost all cases a hollow wooden reading platform is an advantage acoustically.

Choir stalls are usually placed on both sides of the chancel. There seems to have been no limit to the craftsmanship and expense lavished on mediæval stalls. Today decorative treatment is



Chapel of the Holy Spirit
Liverpool Cathedral



Bishop's Throne, Liverpool Cathedral
Sir Giles Gilbert Scott, Architect

BLIC

usually reserved for the back row of stalls. Canopies, either individual or continuous, are customary. These protect the heads of the choristers from down-drafts from the walls. The back rows of stalls should be raised two or three steps above those in front. There again a hollow wooden platform has acoustical advantages. The open space between the front bookrests on either side of the chancel should be kept as wide as possible. The length of the altar may be taken as a minimum distance.

At the end of the choir and in front of the sanctuary step is a broad platform, giving room for communicants and allowing access to the sacristies, etc. This should never be less than 4 feet wide, and where possible it should be considerably wider. Also, where space permits, this platform can be separated from the choir by a change in level of from one to three steps. In larger churches it is desirable that communicants should return to their seats by way of side ambulatories rather than having to brush past those coming up.

The sanctuary is the most important part of the church. The demarcation from the choir is an elevation of one step. At least 14 inches back from the edge of this step is the altar rail or, better still, the communicants' kneeler. One advantage of a kneeling bench is that it allows the communicant to kneel on a somewhat higher level than that on which the clergy stand, and obviates much tiresome stooping by the officiating clergy. For a person of average height 2 feet, 5 inches above the kneeling surface is a convenient height.

In the sanctuary the central motive is of course the altar, which we will discuss later. On the south or "epistle" side of the sanctuary it is customary to place the sedilia (or seats for the officiating clergy), the credence, and the piscina, when it is used. The sedilia, consisting of three seats in connected form (never separate chairs), is often recessed into the side wall of the sanctuary, the credence and piscina frequently being joined to its eastern end. It is customary in American Episcopal churches to provide a fixed chair for the bishop on the north side of the sanctuary opposite the sedilia. The bishop's throne and clergy stalls at Liverpool Cathedral, though on a very much larger scale than is possible in the average church building, are nevertheless well worth studying, as perhaps nowhere in modern work is the woodwork more cleverly worked into the main structure. The main architectural frame is formed in masonry rigidly enclosing the richly carved oak backs of the stalls, while the kneeling desks are subtly tied to the marble floor by an integral marble base or plinth. The aumbry or cupboard, when it is desired, may be recessed in the sanctuary wall to east of the bishop's seat.

Altar. The early movable wood altars were abandoned centuries ago for those of more permanent material. It is interesting to note, however, that wood has made its reappearance in one or two recent churches. The earliest altars were not elevated on steps, being built flat on the pave-

CHURCH FURNITURE

Note: These dimensions are only approximate and may require variation in individual cases

DESCRIPTION	HEIGHTS from FLOOR		DEPTH of SEAT	SLOPE of BACK	SPACING of PEWS & STALLS		NOTES
PEWS	Seat at front 15"-16" Seat at back 14"-15" allows for cushion	Back of pew 30" to 33" to floor	14" minimum 16" excellent	1" in 10" height to 1" in 5" height (Very comfortable)	Back of pew to back of pew 32" to 36"	Allowance per person 19" to 22"	
WALL STALLS	Arms 42" Seat at front 16" Seat at back 15"	Back varies usually has canopy	Do. Do.	Do. Do.	36" minimum 39" common	Arms 26" to 28" on centers	Book boards 33" high above kneeler
OTHER STALLS (MEN)	Seat at front 16" Seat at back 15"	Height governed by stepping of choir platform	Do. Do.	Do. Do.	Do. Do.	Allowance per person 22"	
BOYS' STALLS	Seat at front 15" Seat at back 14"	Do. Do.	14" – 15"	Do. Do.	36"	Do. 20"	Book boards 30" high above kneeler
PULPITS	Floor of pulpit 42" above nave Floor (Min.) 48" average		Parapet 38" to 40" above pulpit floor	Internal diameter 36" sufficient	Book board adjustable size 13"x16" approx.	These dimensions allow of concealed strip-light and acousticon microphone	
LECTERNS	Bottom of adjustable book board approx. 48" above reading platform		Reading platform at least 12" above nave floor	Not lower than chancel floor	Book board adjustable	Do.	Do.
CREDENCE	Approx. height 30"	Approx. length 21" to 26"	Approx. depth 12" to 16"	May be set against east wall on south side of altar or against south wall of sanctuary			
COMMUNION RAIL OR COMMUNICANTS' KNEELER	Height 2'-5" above kneeling surface		Rail set back at least 14" from edge of kneeling step				

ment, but by the fourth century the custom had developed of raising them one step above the floor. Later the number of steps was increased, usually to three. For symbolical reasons it is customary to use odd numbers of steps. These steps are from 5 to 6 inches in height,—never more. The top step, footpace or predella, should extend if possible about 16 inches on either side of the altar, and a minimum distance of 2 feet, 6 inches in front of the altar. The other two steps giving standing room for the assistants must be at least 18 inches wide, and where possible they should be 2 feet in width. The last step may be carried across the full width of the chancel, the bishop's chair sometimes being placed on this level. This has the additional advantage of reducing the number of steps the minister has to descend to reach the credence and piscina. From this front step to the altar rail there should be a distance of at least 6 feet. Nothing detracts more from the dignity of the whole church than a crowded and cramped sanctuary.

Squatness in the proportion of the altar is another common source of architectural discord. Altars should be kept as long as the chancel will permit, the usual rule being to make them from one-third the chancel width, in wide chancels,—to one-half in narrow chancels, 7 feet being taken as a minimum. Other typical altar dimensions are 3 feet, 3 inches high, and from 2 feet, 6 inches to 3 feet, 6 inches deep. The background of the altar may take the form of a fabric hanging, or dorsal, or else be built as a permanent architectural surround known as the reredos. This may be of stone or wood, and often contains pictorial and symbolical panels either in relief or in color, and sometimes in a combination of the two.

An unusual yet charming combination of materials is to be found in the Chapel of the Holy Spirit in Liverpool Cathedral. The altar is of oak with ebonized top and ends. It is intended for use without a frontal, its plain severity being relieved by a slight accent of gold on the paneled front. The reredos over it is still more unusual. The panel is carved in English alabaster. The carved canopy and rich surround are partly of "yellow Rocheret" marble, and partly of wood.

We have now examined practically all the major articles of church furniture, with the exception of the organ woodwork. Organ cases are mainly of two types. First there is the case composed of decorative bases, bands and heads, carrying exposed pipes. The soaring verticals and the sheen of the pipes undoubtedly are most impressive. Secondly there is the enclosed type, the pipes being invisible, and pierced screens being used to permit the outlet of sound. These can be very decorative and have the advantage of being economical, their large areas of more or less repetitive piercings being easily handled by modern wood working machinery. In very large organs a combination of the two types is often employed.

Among the secondary details of woodwork in churches are various fittings such as bulletin boards, alms boxes, etc., while in the sacristies, vestries, etc. other details will be required.

THE INFLUENCE OF SHAPE AND MATERIALS ON THE ACOUSTICS OF CHURCH AUDITORIUMS

BY

F. R. WATSON

UNIVERSITY OF ILLINOIS

INCREASING attention is being paid to the acoustic adjustment of rooms, and numerous publications on the subject afford opportunity for architects and others to become better informed. Commercial companies have developed acoustic materials and have been active in the promotion of their use. Because of these advances, it is now easy to secure satisfactory acoustics, and to thus avoid the criticisms so frequently made in the past of defective auditoriums. The purpose of this article is to discuss the effect on the acoustics of the shape of the auditorium and the materials employed to deaden sound in several different types of churches.

Action of Sound in a Room. If auditors could receive only the sound coming directly from the speaker and have it sufficiently loud, the acoustic conditions would be ideal. This desirable condition is not found in auditoriums, because sound reflected from various surfaces combines with the direct sound to produce new effects. When walls are near the speaker, the sound reflected from them beneficially strengthens the direct sound for auditors, and has the further advantage that it allows the speaker to "hear himself." Reflection from distant walls produces echoes and blurring of speech; and, by repeated reflections, sets up a reverberation. It is thus evident that the acoustics of a room depend directly on the reflected sound, so that a study of the effects of the shape and materials of the reflecting walls should lead to important conclusions.

Effect of Shape of Reflecting Walls. In Fig. 1, the speaker utters sound which proceeds outward in spherical waves, reaching the auditor first as direct sound, then later by reflection from the various walls. Each reflected sound may be thought of as coming from an acoustic image of the speaker. The success of the acoustics in a room depends markedly on how the reflected sound combines with the direct sound. If the difference in time of arrival of these sounds is more than approximately .05 second, a blurring of speech is set up, forming what are called "dead spots." This means that the difference in path between the direct and reflected sound cannot be more than about 56 feet,—a smaller distance being preferred. (Ernst Petzold, *"Elementar Raumakustik."*) According to this rule, the success of the acoustics in a room is dependent largely on the sound reflected only once, which means that later reflections should be minimized by padding reflecting walls.

Inspection of Fig. 1 shows a fairly uniform distribution of reflected sound over the room so that each auditor gets his proportionate share. But consider now the unequal distribution given by reflection from a curved wall, as shown in Fig. 2. Here the reflected sound is concentrated in certain spots, with a corresponding deficiency in other spots. An auditor at E, for instance, would get an annoying reënforcement, while auditors in other positions are likely to get too little. Fig. 3 illustrates a curved wall at the back of a sanctuary. The reflected sound comes to a focus at C where it again spreads out. This arrangement forms an unequal distribution which may be thought of as the combined effect of the real speaker at S together with a second fictitious speaker at C. The auditor DD gets sound first from the real speaker, then an instant later from the image C, a double portion if the wall is a good reflector, while other auditors would not receive this strong reënforcement. Curved walls in an

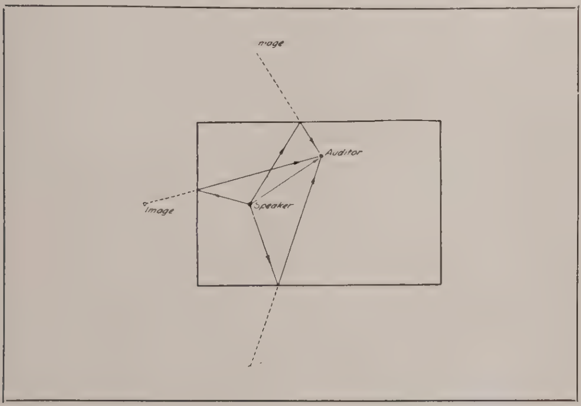


Fig. 1. Sound Reflections in a Rectangular Room

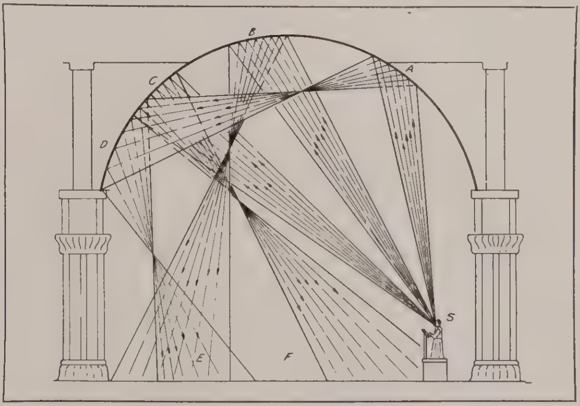


Fig. 2. Concentrating Effect of Sound on Curved Walls

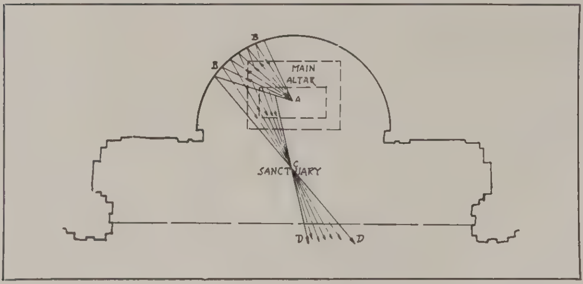


Fig. 3. Distortion of Sound by a Curved Wall

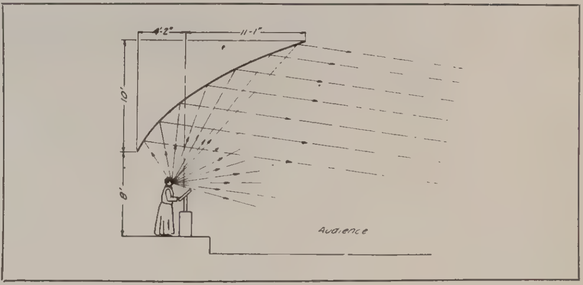


Fig. 4. Parabolic Ceiling Reflects Sound to Auditors

auditorium are dangerous for acoustics and should be flattened to approximately plane walls. If the difference in path of the two sounds is 56 feet or more, a blurring of speech is set up, while if the difference becomes 75 feet or more, distinct echoes,—or separate sounds,—are noticeable.

Parabolic Ceilings. A number of auditoriums have been built with parabolic ceilings, with the idea that the words of the speaker will be reflected uniformly to the audience. Such reflectors operate with surprising efficiency, as illustrated in Fig. 4. Auditors at considerable distances from the speakers hear and understand easily. But the arrangement has some disadvantages. The speaker is supposed to remain at the focus of the parabola, thus forbidding any marked moving about. It would not be suited for use where many people are to be heard as in an orchestra hall or theater, since only one performer could be at the focus. Such a reflector would not be suited for the usual stage arrangements with curtains and stage scenery. Furthermore, any sound originating in the room would tend to concentrate at the focus and thus disturb the speaker. To prevent the speaker's utterances being reflected back to him as echoes, it would be necessary to install highly sound-absorbing material at the rear of the room so as to practically eliminate any reflection. To have such a ceiling successful, it would appear necessary to limit the performance to that of a single speaker at the focus, with effective deadening of rear walls.

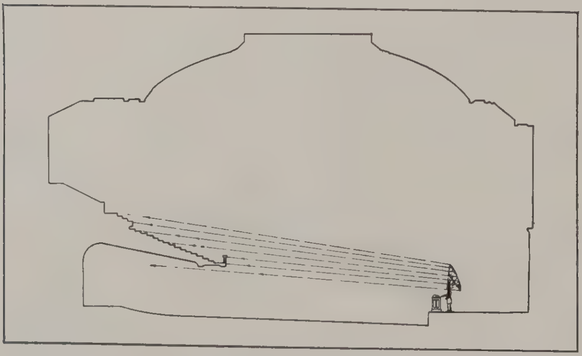


Fig. 5. A Parabolic Reflector Used Effectively at the University of Illinois

Sounding Boards. A plane sounding board placed obliquely over the speaker has much to commend it from the acoustic standpoint. It reflects sound efficiently to the audience instead of allowing it to go to the ceiling with the possibility of there being disturbing reflection; it does not require the speaker to remain in one position; it allows the speaker to "hear himself" and thus to adjust his speech for the best effect. It also amplifies the direct sound. A reflector of this kind could be used effectively as the ceiling of a stage room set, and thus accommodate a number of speakers. It has the possible disadvantage that it might not accord with the architectural design of the room. In the case of an elevated pulpit in a cruciform church, a flat canopy over the speaker acts beneficially as a sounding board. It has the advantages just described for a plane sounding board except that it does not reflect sound to the congregation. Fig. 5 illustrates a parabolic reflector that was tried as an experiment at the University of Illinois. It was effective in sending sound as predicted.

Effect of Using Sound-absorbing Materials. Fig. 1 shows three acoustic images of the speaker, but there are many more under usual conditions, —as many images as there are reflections, sometimes 200 to 300 before a sound dies out. The auditor is thus surrounded by a great number of image speakers who say the same thing as the real speaker. Fortunately, the images far away have only a small effect. The control of this multiple reflection or reverberation is brought about by installing absorbing material in the room so as to confine the speaking as far as possible to the real speaker and several images near him. This arrangement will give sufficient loudness and will avoid blurring and echoes. The amount of material needed for each room may be calculated with certainty of success. This feature of acoustics is the vital factor. No room can have satisfactory acoustics until the reverberation is reduced to the value proper to the room. There is little danger of getting a room too dead, unless too much material is installed on surfaces near the speaker or musician. Usually rooms do not have enough absorption, but this can always be remedied.

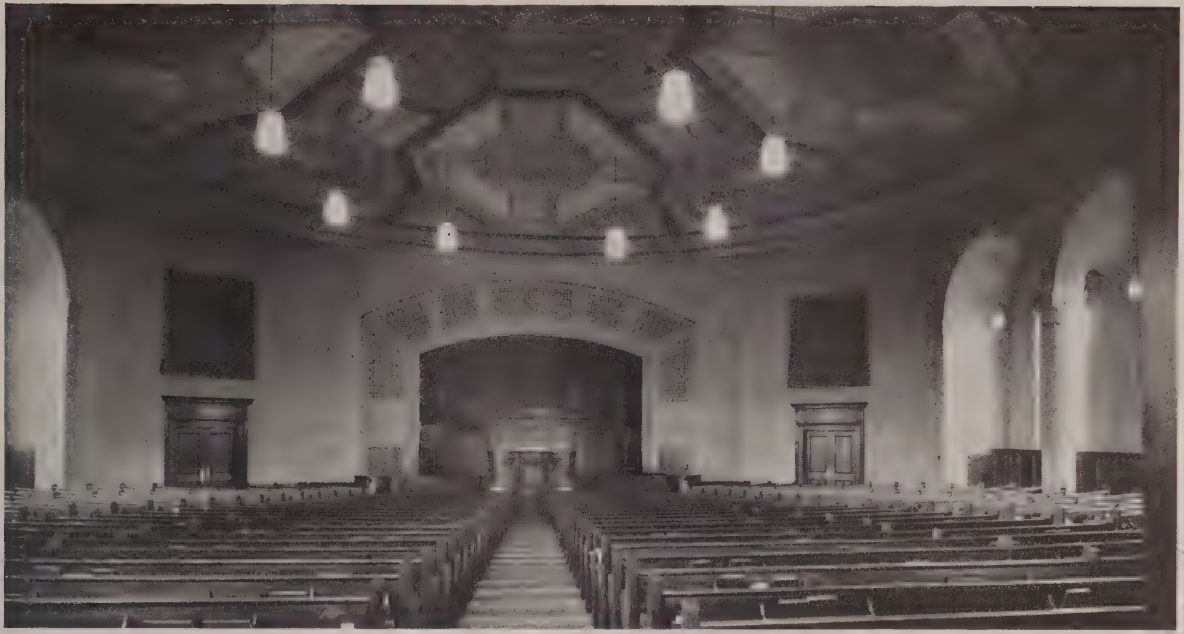


Fig. 6. Good Acoustics Result from Shape and Materials
Second Church of Christ Scientist, Rochester, N. Y.
Gordon and Kaelber, Architects

Christian Science Churches. Fig. 6 illustrates the interior of a typical Christian Science Church. Fig. 8 shows the plan, Fig. 7 the section. In these churches speaking takes place not only from the usual platform position, but also from any position in the auditorium. The octagonal shape favors this requirement. Fig. 9 shows the plan with the speaker at S. Each of the eight walls reflects sound to the auditor at A, whereas in a rectangular room, there would be only four such initial reflections. A further advantage is found with the octagonal shape, in that it avoids the creation of the multiple reflections that occur in a rectangular room between the parallel side walls. In an octagonal room the diagonal walls to the right and left of the speaker reflect sound to the congregation instead of back and forth across the speaker's position. It might be thought that a circular shape would be better than the octagonal, but not so,—the circular wall would produce objectionable focusing of sound. The slightly curved ceiling shown in Fig. 10 has a slight advantage over a flat ceiling. The general effect of the curved wall is to concentrate the reflected sound, with benefit to the congregation, whereas a flat ceiling would spread it out. Also, the curved wall directly over the speaker's head reflects sound to the pews where the flat ceiling would send it directly back to the platform. It is to be noted that the ceiling is fairly low (31 feet), so that no echoes would be expected. There is a small possibility of blurring by reflection from the rear wall opposite the speaker, but it would not be noticeable. A speaker anywhere on the floor would have nearly the same advantage as the speaker on the platform. That is, sound originat-

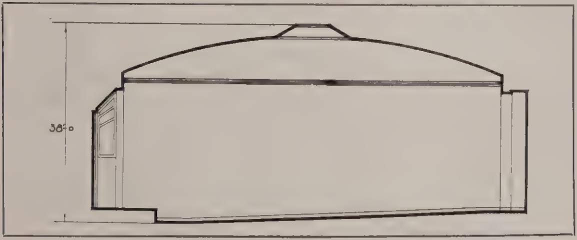


Fig. 7. Section Through the Auditorium

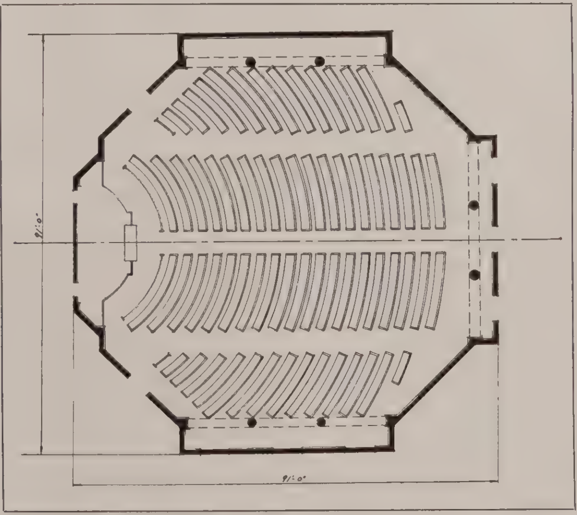


Fig. 8. Plan of the Church

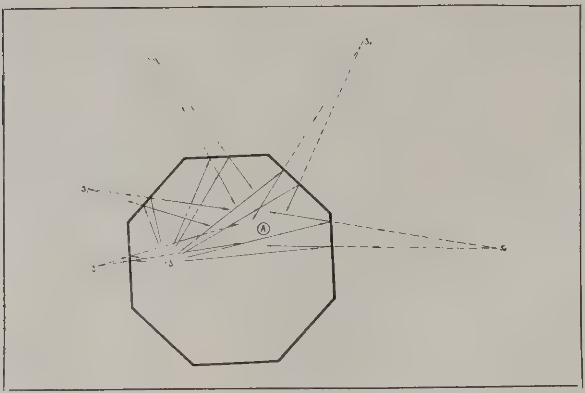


Fig. 9. Advantageous Reflections of Sound Produced in an Octagonal Church

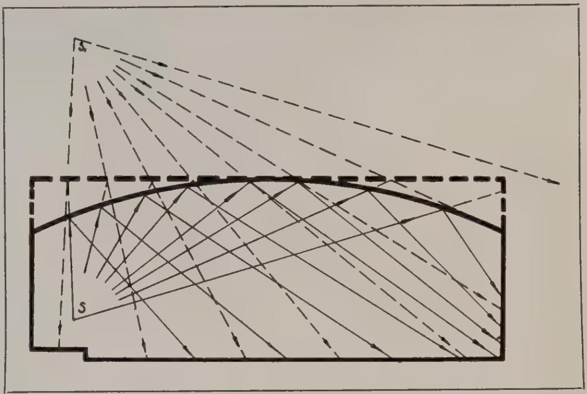


Fig. 10. The Slightly Curved Ceiling Has Some Acoustic Advantages

ing anywhere in the seated area would be reflected from side walls and ceiling so as to reach quite effectively the hearers in other positions in the room. The absorption needed to control the reverberation is found largely in the thickly lined carpet and the cushioned seats, with acoustic plaster on the side walls and ceiling panels. Grilles in the ceiling are of further advantage in absorbing sound. The acoustic results in this room have been very satisfactory.

A Classic Chapel. The chapel pictured in Fig. 11 has excellent acoustics. The original plan called for a flattened barrel vault ceiling which would have produced a noticeable concentration of sound at the center of the church. This curve was modified before construction of the building so as to be much flatter, thus avoiding creating defective concentration. There being large windows on either side, left no choice but to put absorbing material on the floor or ceiling. Accordingly, since the available area was limited, a highly sound-absorbent material was placed on the ceiling, both on the central portion and the side ceilings. The acoustics are such that a speaker in the sanctuary can be understood without effort by worshipers all over the church. Music is also very well heard.

The Moody Memorial Church in Chicago, shown in Fig. 12, is larger than the other three churches described here. Advice on the acoustics when the church was in the design stage led to two modifications of shape. To examine the possibility of there being echoes more exactly, a plaster model of the church was made, illustrated in Fig. 13. A strong light in the position of the speaker sent rays in all directions. Small mirrors placed flat against the wall surfaces reflected the light and indicated clearly what could be expected of sound. As a result of this analysis, the ceiling surface was flattened from the original curve with sharper curves at the side walls to maintain the height of the ceiling. Also the arch

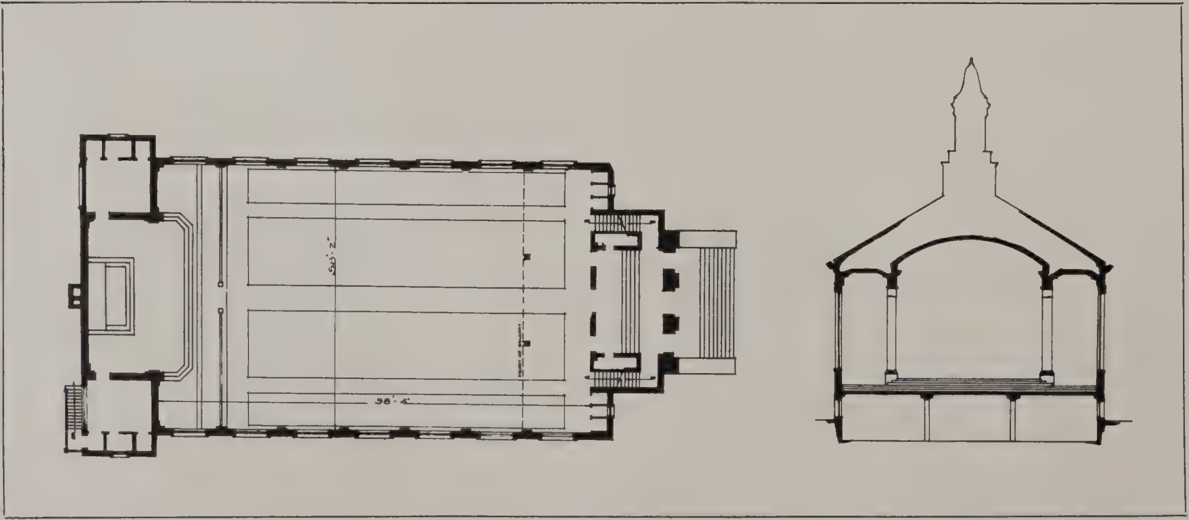


Fig. 11. A Flattened Curved Ceiling Avoids Echoes and Its Absorbing Material Controls Reverberation
Newman Foundation Chapel, Champaign, Ill.

Zachary T. Davis, Architect

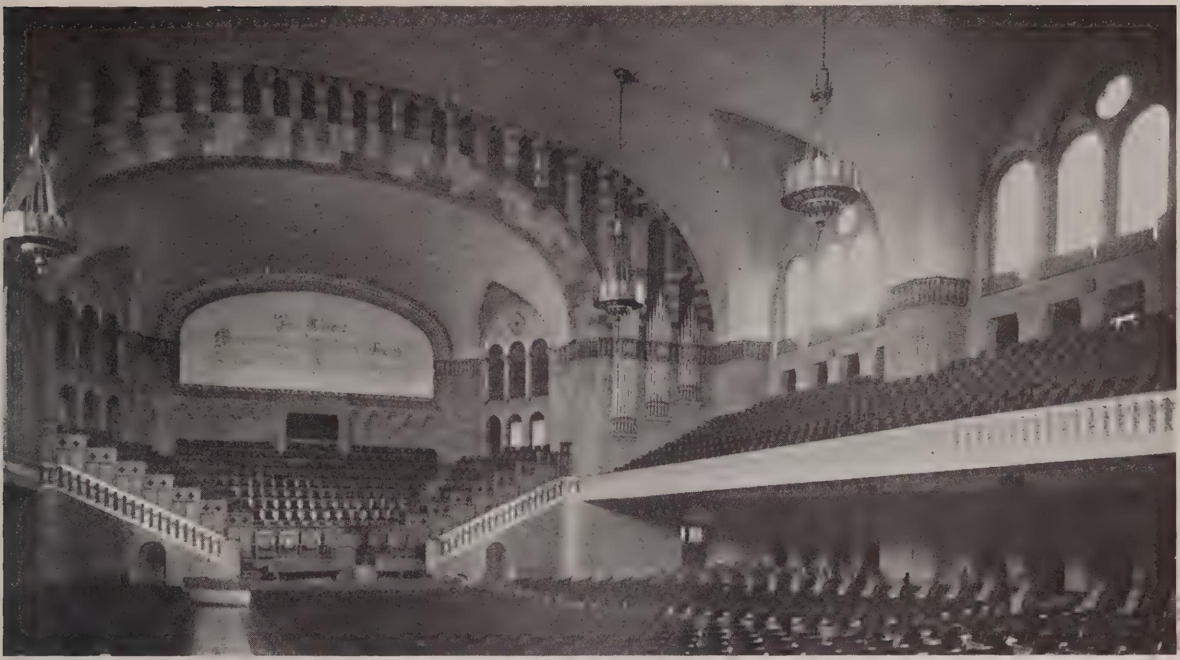


Fig. 12. Absorbing Materials on the Flattened Curved Ceiling Control the Acoustics
Moody Memorial Church, Chicago
Thielbar & Fugard, Architects

over the choir behind the pulpit was modified so as to avoid there being concentration of sound at the position of the speaker. Absorbing material of rather low absorbing value was placed on the entire ceiling surface, with more absorbent material on the lunette surfaces, thus controlling both reverberation and echoes.

Gothic, Cruciform Churches. This type of church is different from the Christian Science type in that the speaking takes place only from the pulpit. The example illustrated has a wooden ceiling, except for plastered arches in the transepts. (Figs. 16 and 17.) The galleries in the transepts and at the west end of the nave accommodate 469 auditors, with 912 seats on the main floor. The reverberation is effectively controlled by absorbing tile placed on available wall surfaces, with absorbing cushions in the pews. The Gothic ceiling prevents direct reflection of sound. The acoustics are reported to be very good.

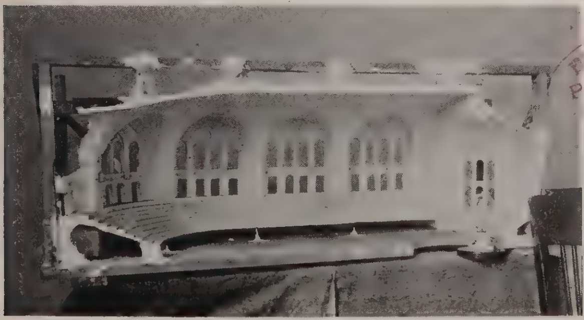
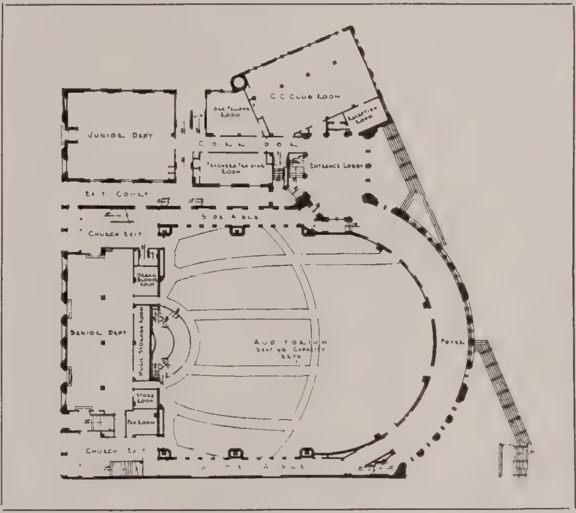
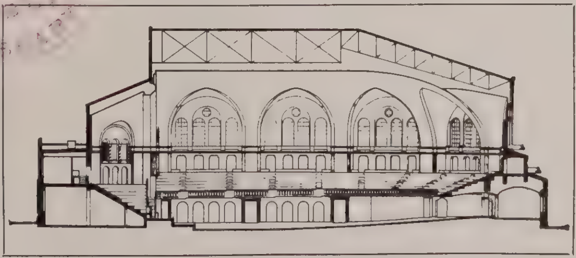


Fig. 13. Plaster Model of Moody Memorial Church Used in Determining its Acoustic Properties

This tabulation gives data for the four churches, showing the volume per auditor:



Plan of Moody Memorial Church



Section of Moody Memorial Church

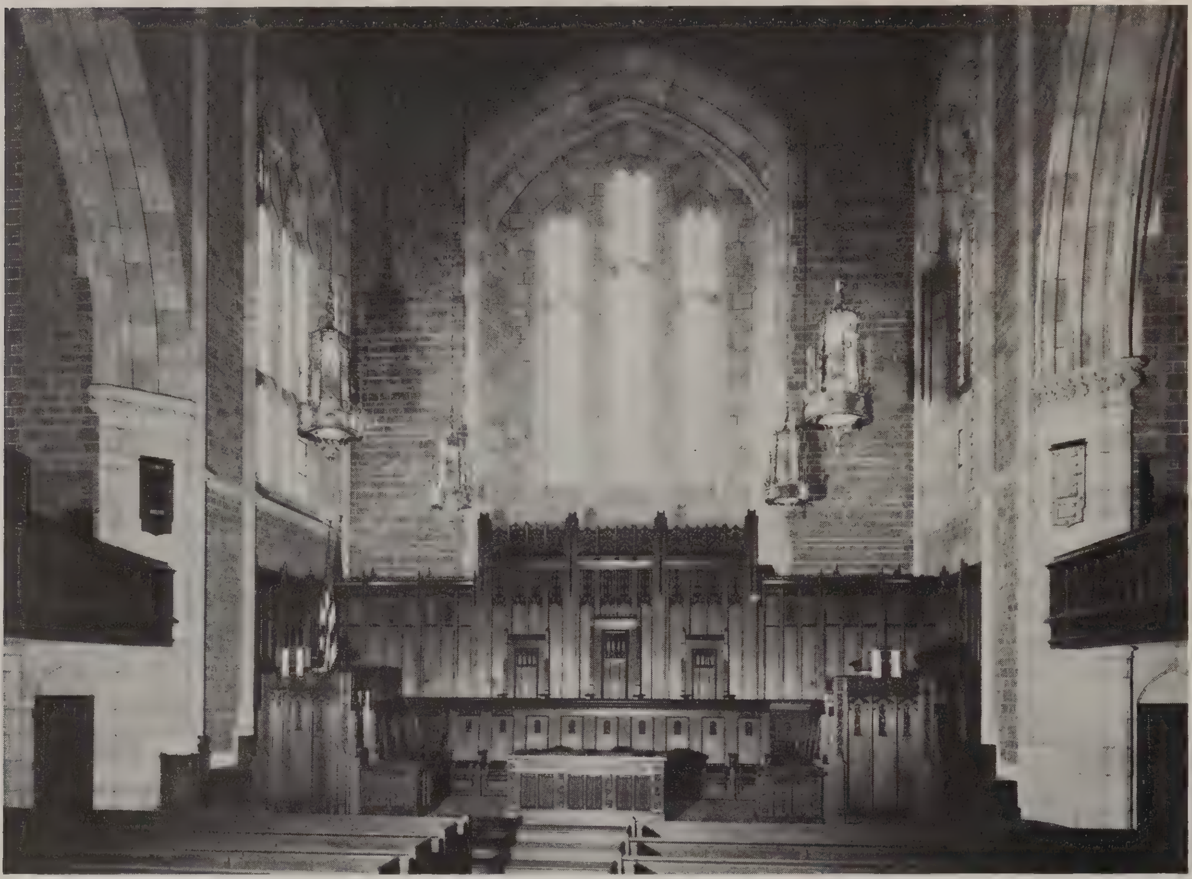
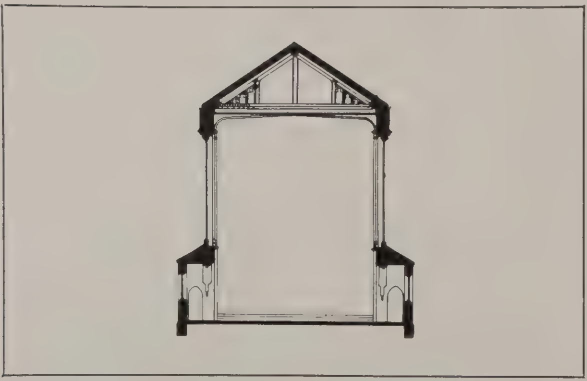


Fig. 14. Cushions and Sound-absorbing Tile Control Reverberation
Bryn Mawr Presbyterian Church, Bryn Mawr, Pa.
Karcher and Smith, Architects

Church	*Volume cu. ft.*	*Audience*	*Volume per Auditor*
Catholic Chapel	188,000	800	235 cu. ft.
Christian Science	197,000	800	246 " "
Bryn Mawr Church	334,000	1,381	242 " "
Moody Memorial	686,000	3,746	183 " "

A word should be added about the value of the congregation in sound absorption. The clothing worn is an excellent absorber of sound, so that the size of a congregation is an important factor to consider. If the congregation is small compared with the size of the auditorium, as in the case of some churches with high ceilings, it is necessary to use considerable sound-absorbing material, whereas in a room with a low ceiling and a considerable number of seats, it is necessary to install only enough material to guard against there being defective acoustics with a small congregation, because a large congregation has sufficient absorption in itself. In practice, calculations are made to determine the amount of absorption needed with a one-third congregation present, with a subsequent check to make sure that the empty room will not be too reverberant,—in which case use of more absorbent is recommended. In conclusion, it should be noted that the four churches described are quite different in design, but are of types which are frequently used. The discussion illustrates the definiteness and certainty of securing good results that are made possible by the present-day study of acoustics, and affords a guidance for architects in the designing of similar churches.



Section of Bryn Mawr Presbyterian Church, Bryn Mawr, Pa.
Karcher and Smith, Architects

CHURCH ORGAN INSTALLATIONS

BY

EMIL PRAEGER

OF THE OFFICE OF MAYERS, MURRAY AND PHILLIP, ARCHITECTS

THE first organ of which we have record was that of Ctesibius of Alexandra about the year B.C. 200, but organs were probably known for some time before. Ctesibius used bellows operated by water pressure to supply the necessary wind, and this method was used as late as the ninth century A.D. From this time on the development of the organ has been constant and unbroken, up to its present state of almost unbelievable perfection.

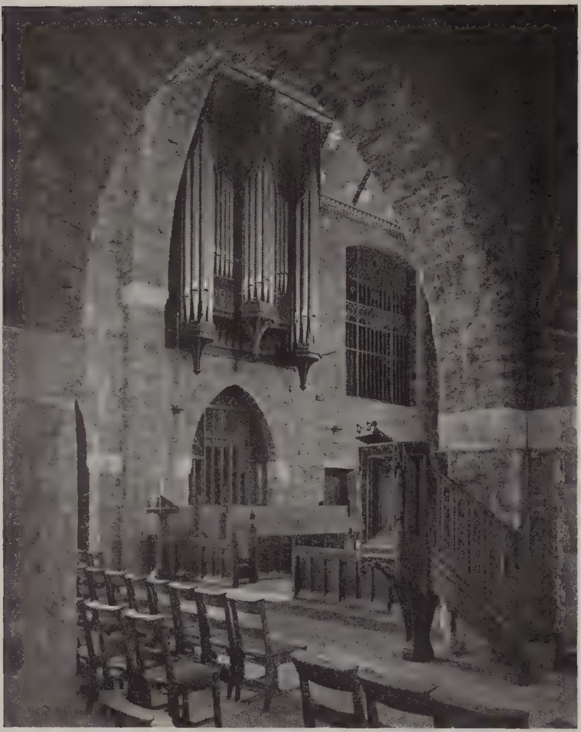
In mediæval days, organs were not common, and the few existing instruments were quite small and usually portable. They were carried about from place to place as the occasion demanded, and this applied to churches as well as to places of amusement. Naturally, compared with the instruments that we know today, there were many defects. As the organ increased in size, its mechanism became more clumsy and heavy, until the player had to beat the keys down with his fists. The bellows were also a source of great difficulty, and constant or equal wind pressure was unknown. In some of the larger organs there were as many as 24 bellows! It was not until after the thirteenth century, when the use of the organ was prohibited in the Latin and Greek churches during worship, that the organ began to find its proper place in the church service. The controversy which followed this prohibition focused attention on the subject, and we find use of organs soon restored in the Latin Church attended by a rapid development; in the Greek Church it has never been reinstated. Since the fourteenth century improvements in the mechanism and wind apparatus have been continuous, and there now seems to be but little opportunity for further development. The organ is now being used in churches, in places of amusements and in homes, in the latter cases being generally of the automatic player as well as of the manually-operated clavier type.

A set-back in the development of the organ occurred in England between 1644 and 1660 when "to better accomplish the blessed Reformation," an ordinance was passed in the House of Lords requiring the speedy demolition of all organs, images and superstitious monuments, in all churches throughout the Kingdom of England. Many fine organs were ruthlessly destroyed, and the art of organ building was lost in England for nearly 100 years. Then organs became more popular than before and were found in nearly all parish churches. Today the organ takes its place in churches of practically all denominations, and its great influence is difficult to quite fully appreciate.

Modern Organs. The modern church organ is generally several organs in one,—the great organ, swell organ, choir organ, solo organ, echo organ and pedal organ. The great organ contains the pipes of largest scale and most powerful tone; the swell organ contains pipes of smaller scale which are inclosed in a box provided with movable shutters; the choir organ contains the flute tone stops and is used for soft accompaniment; the solo organ contains the orchestral stops; the echo organ is made up of stops of small scale and of soft tone; the pedal organ contains the pipes of more powerful tone. As its name implies, the pedal organ is controlled by the pedalboard, while all others are controlled by the "manuals," or hand-operated mechanism.

An organ may be divided into three main parts, —(1) the pipework, (2) the mechanism for blowing, and (3) the mechanism by which the wind is utilized. The pipes are arranged according to the stops to which they answer. Each stop includes a number of pipes which follow one another chromatically. There are some 20 or more different types and shapes of pipes, and the use of many different metals and woods is resorted to. Pipes are broadly divided into flue pipes and reed pipes, and these are again divided into different kinds and made in varying lengths from a few inches up to over 32 feet. Pipes of various stops stand upon wind chests which contain air channels through which air is admitted from an air chamber through a slide which is installed between this chamber and the air channel. The slide is controlled from the keyboard of the console. In the early organs the slide was directly connected to the key by means of a series of rods and levers. As the organs grew larger, improvements of this action were made, first by the introduction of compressed air, known as the tubular-pneumatic action, and later by the introduction of electricity, so that we now have the electro-pneumatic action. When the key of a modern organ is depressed, an electric circuit is closed, and this sets into action a series of operations which terminate in opening a valve and admitting air into the controlled wind chambers, thus producing the desired sound in the various pipes.

The provision of sufficient wind has been a serious problem. In the early organs an unvarying wind pressure was unknown, and while this condition was improved by the use of a weighted wind reservoir, it was not until the invention of the multiple fan that this problem was solved. The multiple fan consists of a number of fans



Organ in Choir, Christ Church, Bronxville, N. Y.
Bertram Grosvenor Goodhue and Goodhue Associates, Architects

mounted on a single motor-driven shaft, each fan occupying a compartment of its own, and all serving equally to raise the wind pressure to the desired point. The production of an effective tremolo with an unshakable wind pressure was a problem which organ builders had some difficulty in solving, but by means of some very ingenious mechanism, this has now been accomplished.

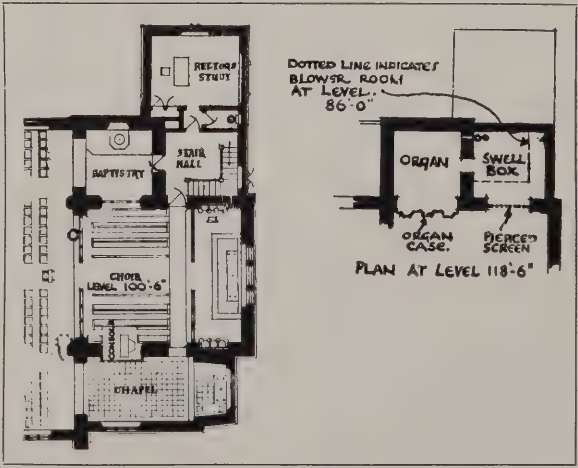
The design of the swell box and the mechanism to operate the shutters has been the object of careful study and much experiment, and here again practically perfect results have been attained. An effective swell box should be properly proportioned; it should be wide, high, and not more than half as deep as it is high. The shades should fit well and operate easily. In the present organs the shades are operated by electro-pneumatic control, a matter presenting more difficulty than the similar operation of the wind chest.

The console of the modern organ is an impressive instrument. It may also be a very handsome addition to the chancel furnishings, but in some cases, the console is entirely or partially obscured.

The specifications of an organ constitute a matter which should not be settled without the aid of an expert organist and organ builder. The larger organs have as many as 100 stops and seemingly countless pipes. Suffice it to say, however, that size is not the sole attribute to satisfactory installation, and installing an over-powerful organ in a small church is to be guarded against.

The location of an organ in a modern church is a subject which has caused architects and organ builders no end of controversy and, at times, bitterness. In contrast to almost every other unit of a church, there are no hard and fast rules governing the type, size and location of the various component parts of an organ. The reason for this is easily understood; with some notable exceptions, the majority of present-day churches have been planned following mediæval models, in which, because there were no large stationary organs, no special organ space was provided. Had the cathedral builders of the middle ages large organs to provide for, the views of present-day architect and organ builder might not be as conflicting as is now often the case.

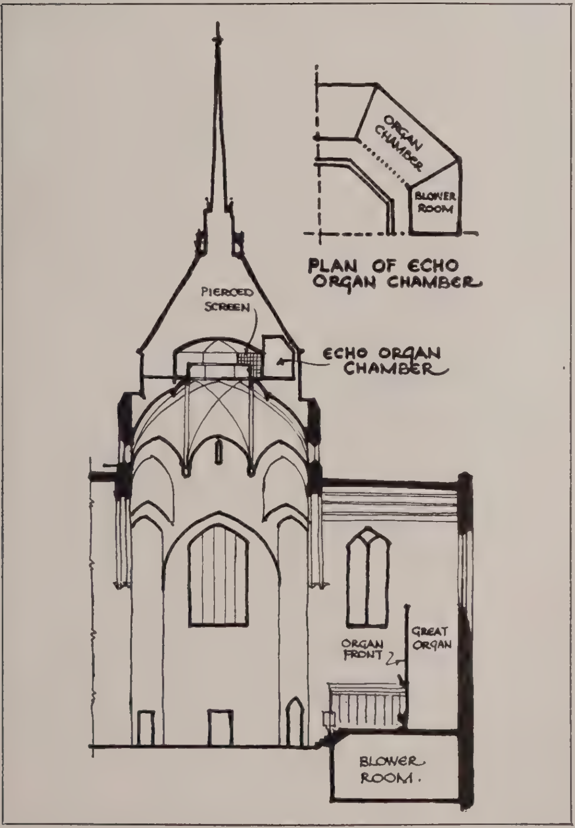
In considering the layout of the various parts of an organ, there are several interests to be considered,—those of the clergy, the singers in the choir, the organist, the organ builder, the congregation and the architect. Each of these has interests conflicting with the interests of the others, and it is not difficult to realize that differences of opinion, jealousies and quarrels have only too often cropped up. The mediæval organs, being small, were almost always installed in the choirs so as to be in close relation with the singers. After the twelfth and thirteenth centuries, as churches and cathedrals became longer and higher, the necessity of appropriate locations of the organ parts became apparent. During the fifteenth century we find organs being installed in elevated positions, either bracketed from the walls of the choir or placed at the west end of the nave. In some instances we find organs placed in transepts and again in intermediate bays of the choir. There are instances of organs being placed on rood screens, and again cases of several organs being installed in different parts of the church.



Layout of Organ Installation, Christ Church, Bronxville, N. Y.
Bertram Grosvenor Associates, Architects

In the church of today, there are many factors affecting the proper location of an organ, one of the most important being the nature of worship to which the particular church in question is devoted. Churches in America may be divided into three main groups: (a) the Latin Church; (b) the Anglican Church; (c) the several churches dissenting from the other two groups. Of these groups, some prescribe musical services as part of the ritual, while in others instrumental music is of a congregational and voluntary character. In Roman Catholic churches, the music is of a liturgical character, and the position of the organ is almost invariably at the west end of the nave, in a gallery which also accommodates the singers. As the music is part of the services, the fact that it comes from behind the congregation is not considered objectionable. In some churches the great organ has been placed in a space behind the altar and the musical effects have been satisfactory.

It is quite generally agreed that the organ used to accompany the choir should be placed as close as possible to the singers so that a unity of musical effect may be obtained. An accompanimental organ should not be large and need never contain "speaking" stops. Probably the ideal arrangement for the present-day church is to install the great organ at the west end of the nave and to place the accompanimental organ in the most advantageous location with respect to the position of the choir. In the English cathedrals and churches we find many organs placed over the choir screen, and while this location is not good from an architectural point of view, it is excellent in many churches from a musical standpoint because there is a free space all around the organ, and it fits in well with the grouping of the singers.



Plan of Organ Installation, Epworth-Euclid M. E. Church, Cleveland

Mayers, Murray & Phillip and Walker & Weeks, Associates, Architects

Echo and Choir Organs, Epworth-Euclid M. E. Church, Cleveland

Mayers, Murray & Phillip and Walker & Weeks, Associates, Architects

When the size of the organ becomes so great that it is not practical to place all the pipes in one chamber, it becomes necessary to use a divided organ. An excellent example of use of a divided organ is found in St. Thomas' Church, in New York, where one of the finest modern church organs is installed. In a divided organ the pipes should be placed so that their sounds will be perfectly unobstructed, and the sections should be balanced as an accompanimental instrument. The console should be so located with respect to both sections of the instrument and the vocal choir that the organist will at all times be able to realize exactly the effect of his accompaniments.

For undivided organs, authorities seem agreed that the best location is at one side of the choir or chancel, immediately adjoining the choir stalls, with the console at the side of the chancel oppo-

Pipes Not Exposed, Trinity English Evangelical Lutheran Church
Bertram Grosvenor Goodhue and Goodhue Associates, Architects

site the organ chamber. There have been instances of organs placed in the transepts, but for modern churches this location should be avoided. The organ should be close to the singers; it should have plenty of space around it and ample height above the top. The organist should be able to hear the organ and choir equally well, and he should be able to see the choir and clergy. He should also be able to hear the congregation and have a view down the nave. Where side chapels exist, the organist should be able to use the organ in connection with services held in these chapels, but this is frequently difficult of accomplishment.

The lower part of a tower adjoining the chancel should not be used as an organ space, especially in a small church where the tower is of small area and the openings are considerably lower than the ceiling of the nave. There have been instances where the organ has been placed in the basement below the nave floor level, but this scheme is not recommended, except in the case of a small echo organ, where the results may be very effective. From the standpoint of the congregation, there are objections to placing the organ at the back of the nave, as it is of course more agreeable to face the music than to have it come from behind. It is well to elevate the organ above the level of the congregation, but at the same time the great and accompanimental organs should not be placed too high above the level of the nave floor.

In regard to the organ space itself, there are certain conditions which should be effectively met. The temperature should be kept constant, at approximately 70° Fahr. For this reason the north side of a chancel is more desirable than the south, because of the fact that this side is more constantly in the shade. There should be no windows to the exterior, thus avoiding air currents and the infiltration of dust. An organ chamber should preferably be twice as wide as it is deep and should be high enough to easily accommodate the tallest pipes. The opening between the organ chamber and the church proper should be designed to avoid a "pocket" between the chamber ceiling and the wall over the opening. The walls and ceil-

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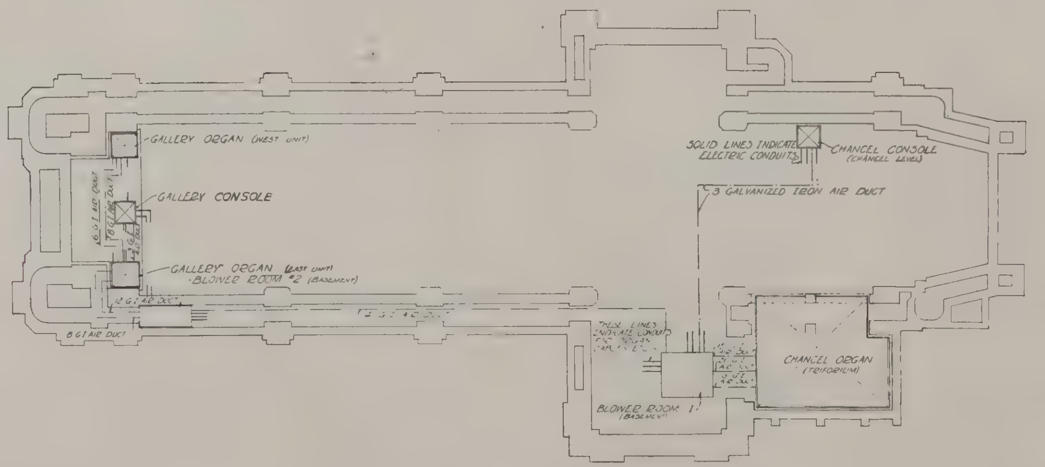

GALLERY ORGAN (WEST UNIT)
GALLERY CONSOLE
6 G I AIR DUCT
8 G I AIR DUCT
3 G I AIR DUCT
GALLERY ORGAN (EAST UNIT)
BLOWER ROOM #2 (BASEMENT)
12 G I AIR DUCT
8 G I AIR DUCT
SOLID LINES INDICATE ELECTRIC CONDUITS
CHANCEL CONSOLE (CHANCEL LEVEL)
3 GALVANIZED IRON AIR DUCT
THESE LINES INDICATE CONDUITS FOR ORGAN
CHANCEL ORGAN (TRIFORIUM)
BLOWER ROOM 1 (BASEMENT)

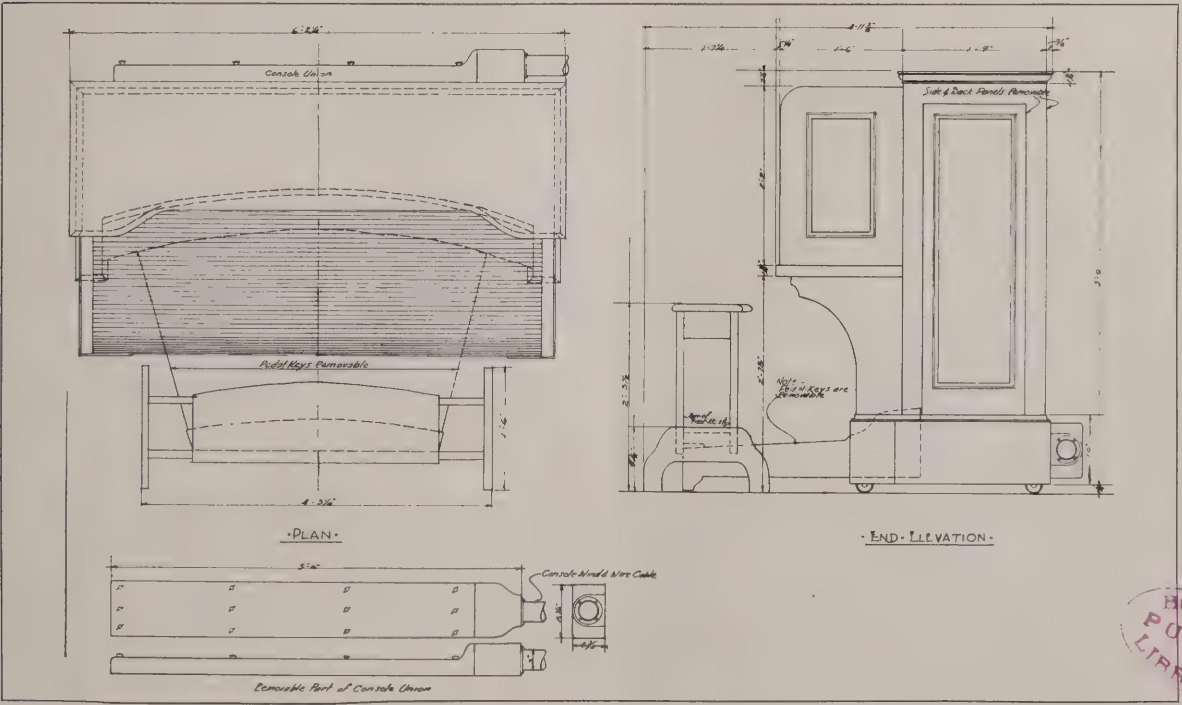
Diagrammatic Layout of Air and Electrical Conduits, Chapel of University of Chicago
Bertram Grosvenor Goodhue and Goodhue Associates, Architects

ing of the organ chamber should be plastered with a hard wall plaster so as to reflect the sound to the best advantage. In some cases it will be found advisable to slope the ceiling from the rear to the front of the chamber, but this will not be necessary if the depth of the room is not too great.

The blowing mechanism may be placed in the basement, but it should be in a room which is perfectly dry, which has proper ventilation, and which is carefully insulated from dust, dirt and drafts. An enclosure of wood is better than brick, since it is less resonant and less subject to condensation than a brick wall would be. In order to prevent the noise of the blower from traveling to the organ, an air reservoir should be placed next to the blower within the blower room. Air then passes from the blower through an automatic gate which closes when the reservoir is filled, preventing the noise of the fan from traveling through the main trunk.

Organ Pipes. The question of whether or not exposed pipes should be used has been the cause of much difference of opinion between architects and organ builders. Some organ builders have contended that decorative display pipes that do not "speak," but which complete the symmetry of an organ case design, are as "honest" as any other decorative features incorporated in a church. Where exposed pipes are not used, use of carved organ screens has been resorted to, and here the opportunities for displaying originality of design are limitless. The screen, moreover, offers less obstruction to the tone of an organ than do the front pipes, as the total percentage of opening can be made larger when a screen is used than is possible with display pipes. Although organ

Choir Organ, St. Bartholomew's Church, New York
Bertram Grosvenor Goodhue, Architect


Console Union
Pedal Keys Removable
·PLAN·
Side & Back Panels Removable
Note - Pedal Keys are Removable
·END·ELEVATION·
Console Wind & Wire Cable
Removable Part of Console Union

Details of Movable Console of Choir Organ, Chapel of University of Chicago
Bertram Grosvenor Goodhue and Goodhue Associates, Architects

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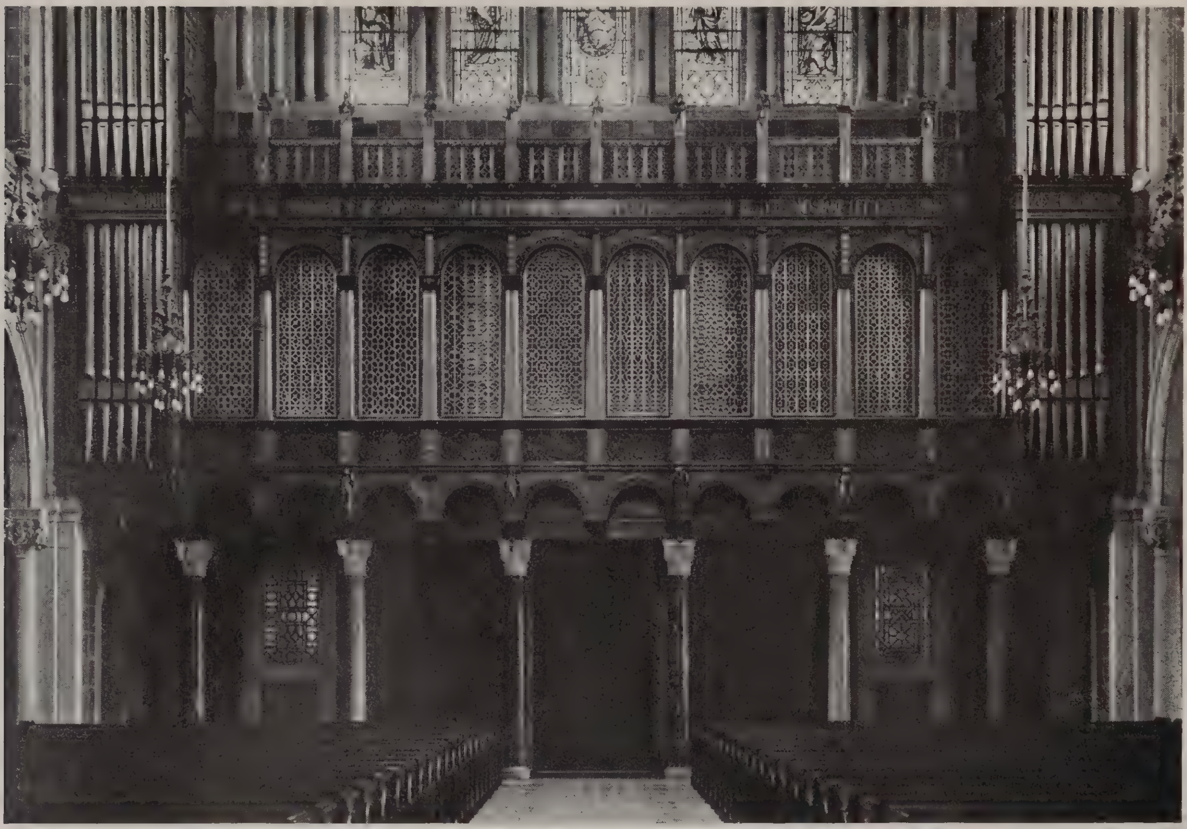


The Great Organ, St. Bartholomew's Church, New York

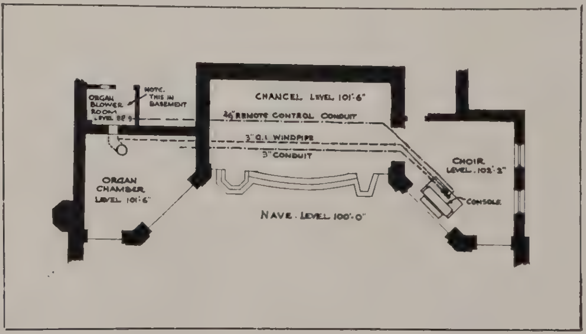
Bertram Grosvenor Goodhue, Architect

screens have ordinarily been made of wood, various other materials may also be used if desired.

In making provision for the installation of an organ in a modern church, the services of an expert organ builder and organist cannot be enlisted too soon. There have been only too many instances where makeshift arrangements have had to be resorted to at the last minute in order to in any way accommodate the necessary equipment. In these cases the results are never as satisfactory as they might have been, had proper provision been made at the inception of the project. Indeed instances are not lacking where making no provision for an organ installation in the first place has resulted later on in the marring of an otherwise fine church. An organ need not necessarily be made the most important architectural detail of a church, but it possesses great architectural possibilities which should not be overlooked.

Organ Installation, Chapel of University of Chicago

Bertram Grosvenor Goodhue and Goodhue Associates, Architects



Plan of an Organ Installation near Pulpit

LIGHTING FIXTURES FOR CHURCHES

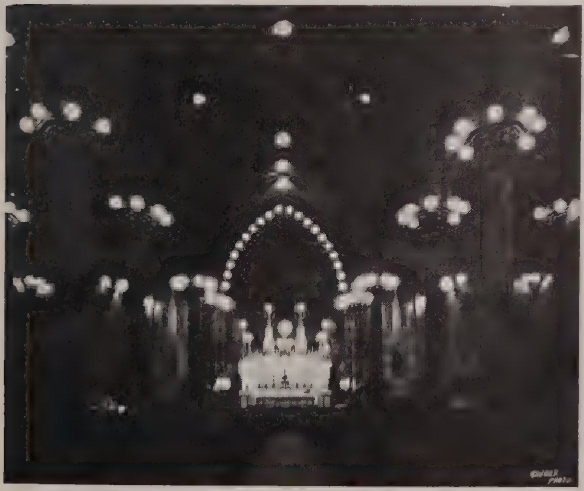
BY

THEODOR CARL MULLER

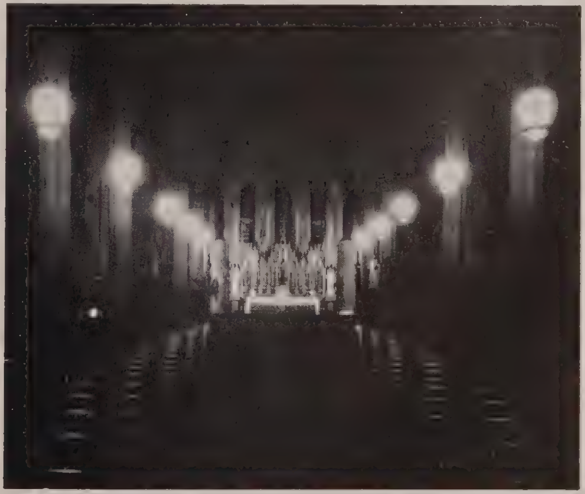
AS architecture discards the illustrative nature of imitative styles for forms based more directly upon human reaction, in this revival of the visual sense, it follows that light should not be considered merely as a means by which we see, but as a medium which controls the manner in which we see. Today, when night hours and the urban interior are so closely related to life, the controllable manner of seeing is more prevalent than ever before. The dependence of architecture on illumination is well exemplified in the fact that bad light can ruin good architecture, while well controlled light,—or better, its component, well controlled darkness,—can save us from bad architecture. Hence, that illumination is bad which fails to fulfill the architectural necessity.

Electrical progress in illumination has developed along two distinct lines, the one striving to perfect incandescent units as a utility, the other exhaustively striving to reproduce the exposed flames of the past. The cold hearth that simulates in glass a living grate of coals, the facility with which the electrician can wire an antique fixture reproduction, and the real wax candle wired to bear a tiny, flame-shaped, flame-tinted bulb which stands even upon the altar of a church, all these are the most damning evidences of the dearth of contemporary design in lighting fixtures. Rousing manufacturers to better lighting design is the architect's responsibility, but even greater is the need to study light as a most vital element, from the earliest conception of a building to its final adjustments and furnishing.

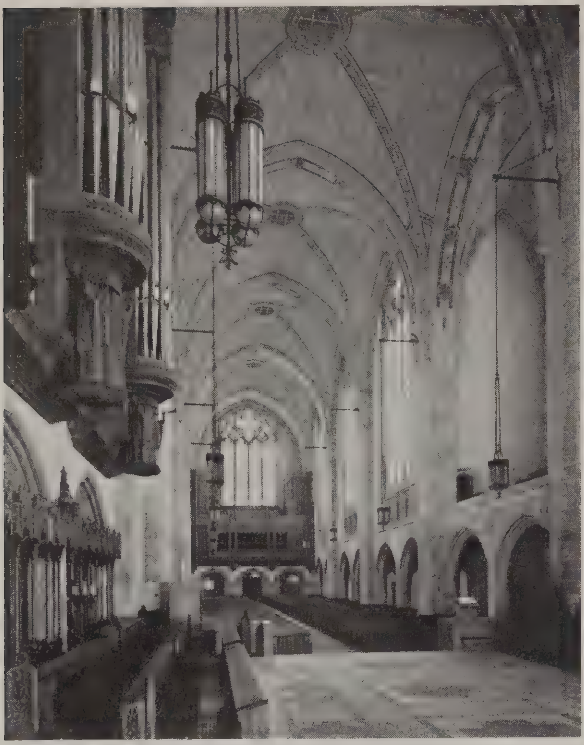
The progress which lies in the adaptation of the incandescent unit to form an integral part of architecture is slow, and its protagonists are at variance in practice more than in theory. While each individual building may present a separate problem, the understanding of light lies in the simple generalities of its action on the optic nerve, its own associational effect upon the mind, and the manner in which it affects the form and color of objects which reflect it. Comfort, due to the physical structure of the eye and lid, demands that a major light source be about 45 degrees above the plane of sight, and that glare due to strong contrasts be eliminated, but not to such an extent that our appraisal of light by contrast with darkness is destroyed. It is the danger of indirect lighting that it leaves one confounded as to its value. Adequate indirect light may soon appear dull to the weary eye that has no darkness to rest upon. The lack of shadow tends to steal one dimension from our normal conception of space, forcing us to rely wholly upon the more difficult definition of space by perspective. The loss of high light and glitter destroys the sense of surface and material; mosaic and metals might as well be paint, jewels might be paste, and our own faces masks with dead eyes. Take from light the color of warmth, and some of the human satisfactions which gave rise to fire worship are denied, such as our pleasure in flame and sunshine. Psychological effects have been produced in the name of scientific lighting that could not have arisen from nature's dreariest day. With such considerations as these, very real attempts



Effect of Carbon Filament Bulbs Distributed over a Church Interior



More Recent View, Showing Simplification and Flood-lighted Altar

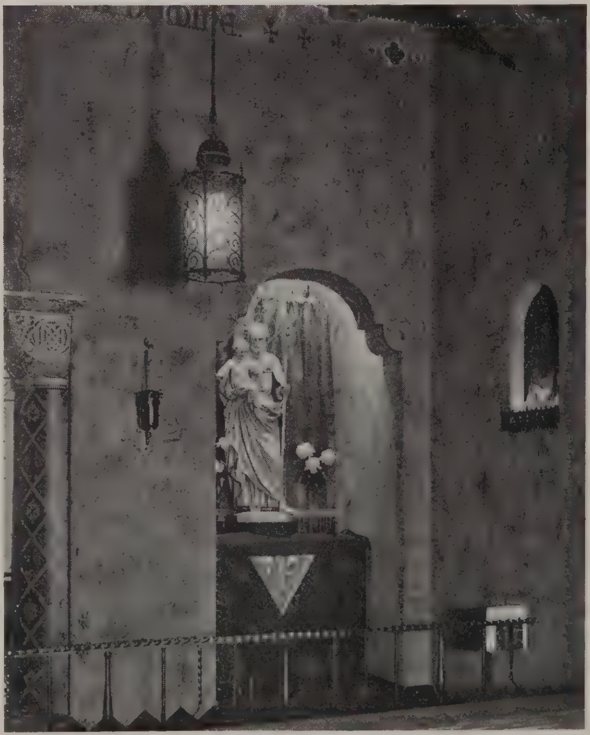


Chapel, University of Chicago
Bertram Grosvenor Goodhue, Bertram Grosvenor Goodhue Associates, Architects

in church illumination have been made to re-create the desirable human reaction peculiar to good antique illumination without the attendant slavishness to antique forms, and without compromising the virtues of modern artificial light. With the continued development by the engineers, these attempts may soon appear as primitive as the latter-day indiscriminate distribution of exposed bulbs and the decorative use of these as large and luminous pearls from natural delight in the display of novelty.

It was a sincere expression, superseded by the greater practicability of using less numerous but more powerful units. The lighting fixtures illustrated here are but a few types which arose out of this transition and out of the growing understanding of light. Bad design led to the desire among some architects to create a church without lighting fixtures, as were the mediæval churches, but to do this it has seemed necessary to adopt methods even more harmful to architecture than the use of mediocre lighting fixtures. Certainly there is nothing more destructive to the normal concept of architecture than indirect lighting which emanates from such unnatural sources as are sometimes resorted to in many cases. Indirect illumination seems to demand new architectural forms, whose organism would express this new light source, in a sense, as a fixture. It might seem natural to force artificial light as daylight through the windows, but, fortunately, the expense is enormous. Creating the illusion of daytime over and above the human knowledge that it is not, certainly should be a magic foreign to the sincerity which should be an attribute of the Church.

Rightly conceived, the fixtures constitute but an added element with no greater limitation than that of any other part of the building. Their interior quality is one worthy of expression and often mistaken by the use of shapes originally intended to weather the elements. Stability in a hanging feature is as necessary as that of the general structure. Low centering of gravity, width of base and design of chains can effect this. Into the decorative treatment there may enter the sense of scale and a very emphatic stylization, due to the dominance of the unavoidable contrasts. An appreciation of the stylistic beauty of Romanesque and Gothic metalwork, the finest examples of which are found in the lantern and candelabra type, known as the *corona lucis,* led to a desire to use this as a base for the design of modern fixtures. Misunderstanding brought about the appearance of a dozen or more gorgeously decorative chandeliers completely dominating the interior. The *corona lucis,* which often was a veritable metal cathedral in miniature, was generally hung alone or with two others at great height before the chancel or in the transept and was never used for illumination alone. It was



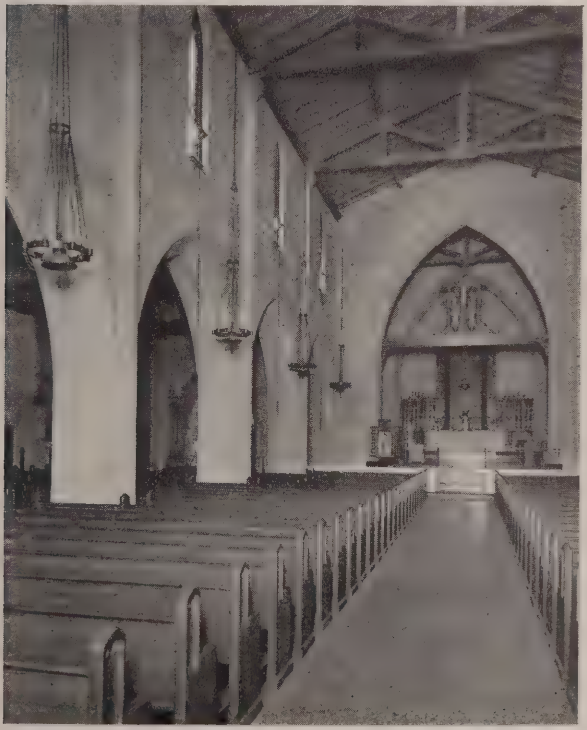
St. Vincent's Home Chapel, Brooklyn
McGill & Hamlin, Architects

lighted but several times during the year, and then only when it formed an important ornament for some ceremony.

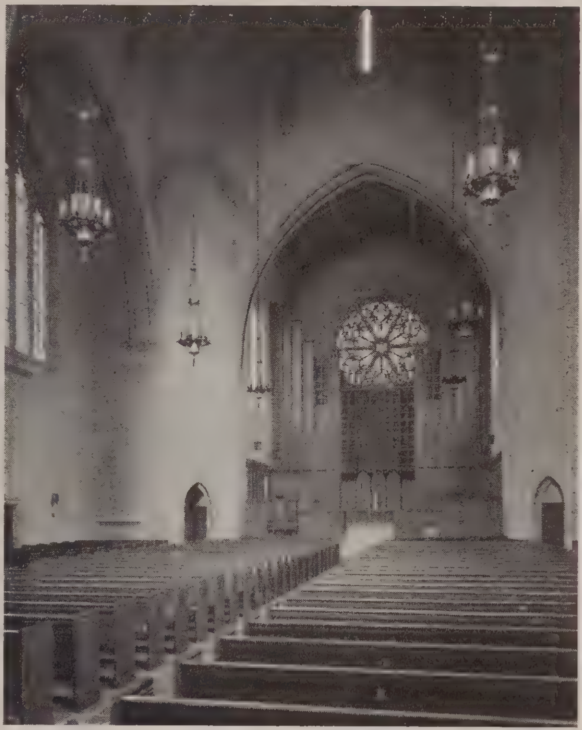
The single unit fixture type is advocated by many because of the greater efficiency of high-wattage bulbs, the simplicity of construction, and the diminution of replacement effort. The segmental sphere, such as used in the Church of St. Boniface, Pittsburgh, tetrahedron and other bi-symmetric forms, were designed to distribute the excessive glare over larger luminous surfaces. The components of light are equal in all directions. The parallel-sided fixture with open bottom and closed top sufficed for the church which demanded downward light for the prayer book or hymnal with relative darkness at the ceiling, which remains mystical. The difficulty encountered was a bowing of the sides caused by the greater brilliance in the glass and the rotation about opaque material nearest the light source. The metal *corona* ring attempted to hide this destroyed area, as may be seen from the illustration of the "Little Church Around the Corner," in New York.

Covering the glass surface with metal filigree work of fairly regular pattern helped to retain the form of the fixture when lighted. Another expedient was to spray the inside with an enamel, carefully graded to equalize the exterior light distribution. Finally, a diffusing glass was perfected which could contain a high-wattage bulb without distortion, even in cylindrical form. Until but a few months ago this glass of light amber hue was obtainable only in sheet or limited cylinder sizes. Particularly interesting are the fixtures hung in the Friars' Chapel of the Church of St. Vincent Ferrer in New York. To obtain length, two cylinders were joined together. The obscuring surface of the supporting members, running from top to bottom, has been minimized, and they are built out like fins to give actual strength as well as the appearance of strength. A modern Gothic fixture in the character peculiar to the architecture of the English Lutheran Church of the Redeemer, Brooklyn, embodies the latest development in light amber diffusing glass. Except for an acid-fumed finish with lacquer preservative, the brass is left free from hammer marks or other effects, to express the rolling, spinning, and cutting machines which formed it. All of these will be rendered obsolete when a light source is produced of greater intensity and without filament concentration, contained in glass undefined by the passage of light through it. Then they shall be considered as their forerunner,—decent, limited solutions, replaced perhaps, and let us hope never resurrected in some future century as antiques to be illuminated by some science beyond that which produced electricity, though that possibility seems remote.

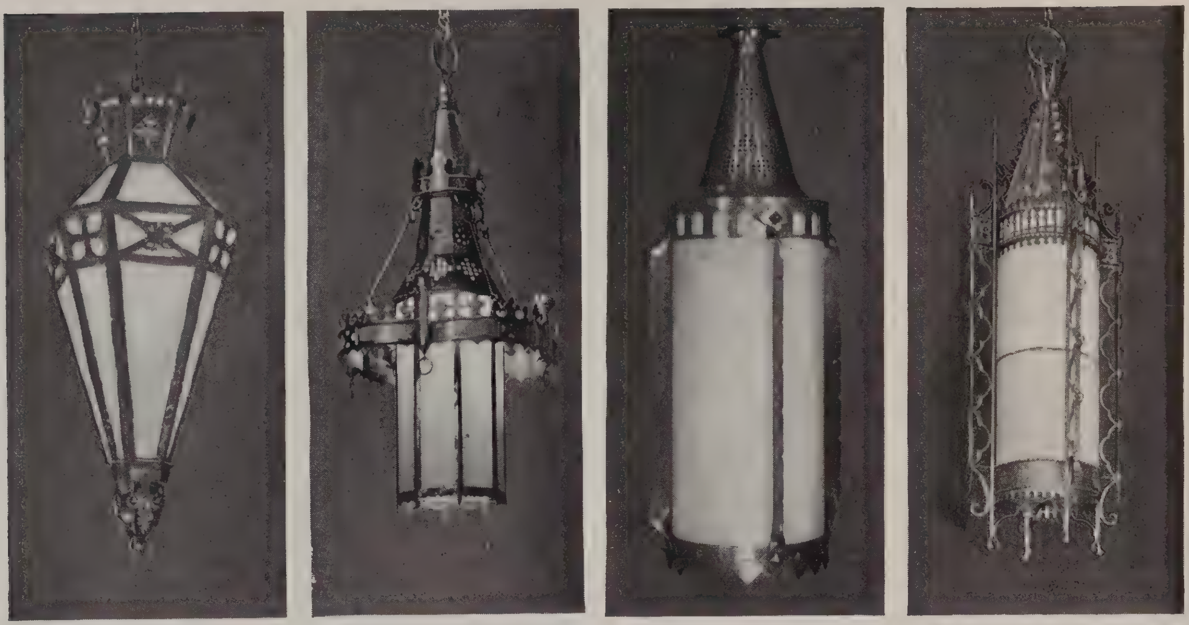
The shielded or reflector type used in St.



St. John the Evangelist's Church, Brooklyn
McGill & Hamlin, Architects



Epworth Euclid M. E. Church, Cleveland
Mayers, Murray & Phillip, Walker & Weeks, Associated, Architects

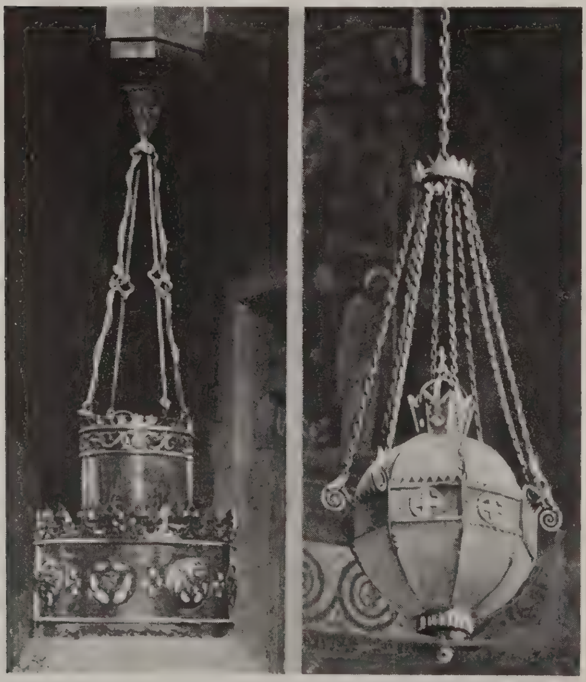


Chronological Development of Diffusing Class

St. Pancras', Glendale, N. Y.
"Little Church Around the Corner"

Church of the Redeemer, Brooklyn
Chapel, St. Vincent Ferrer's, New York

Agnes' Church, West Chester, Pa., is valuable in a church with light-absorbent dark walls and wood ceiling where light not directed downward is lost. One standard reflector is placed in the top; the bottom widens to hold a large area of diffusing glass through which the intensity of the reflector spreads. The lower metal ring is pierced and glazed to obtain interest of motive and sparkle. The danger with this type lies in focus, so that the plan is not broken into circular areas beneath the fixtures. Exaggerated ceiling height and mysticism are gained, and the darkness of the surroundings promotes concentration upon the prayer books or illuminated chancel. The tendency, however, is for people to orientate themselves toward a single fixture, which from some seats may be quite awkward. The better general illumination of large luminaires is sacrificed for the special virtue of the reflector type.



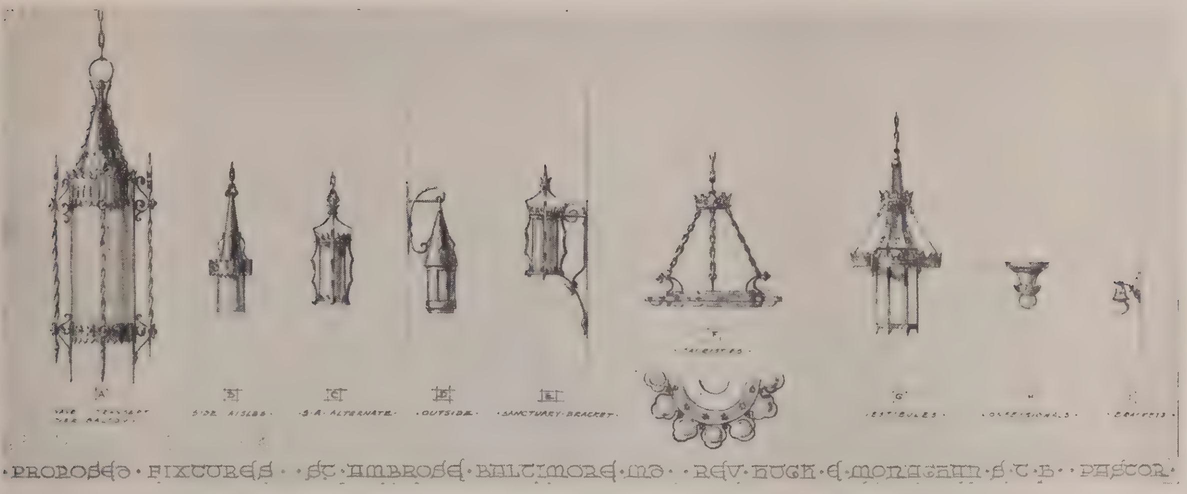
Directional Fixture and a Globe Fixture

St. Agnes' Church,
West Chester, Pa.

Church of St. Boniface,
Pittsburgh

The multiple-unit fixture type is the outcome of lighting very large churches, where the single bulb is not adequate for the fixture which retains the scale of the interior. When the nave is extraordinarily wide, an even distribution of light demands that the source be placed at about the usual height, which in the average sized church approximates 12 feet. It has been found practicable to decrease the replacement difficulties of inaccessible fixtures by using a great number of medium-sized bulbs, wherein the failure of a single bulb is of negligible importance.

The fixtures of the Epworth Euclid M. E. Church, Cleveland, were designed almost wholly for their decorative advantages. The distribution of electrical units is complicated but answers the lighting requirements as well. The lower portion of the central cylinder is occupied by a powerful reflector, and throughout the remainder of the central cylinder small bulbs are distributed, purely for the pleasing luminosity of the glass. The surrounding ring of small cylinders not only increases the mass to attain a scale corresponding to that of the church but also

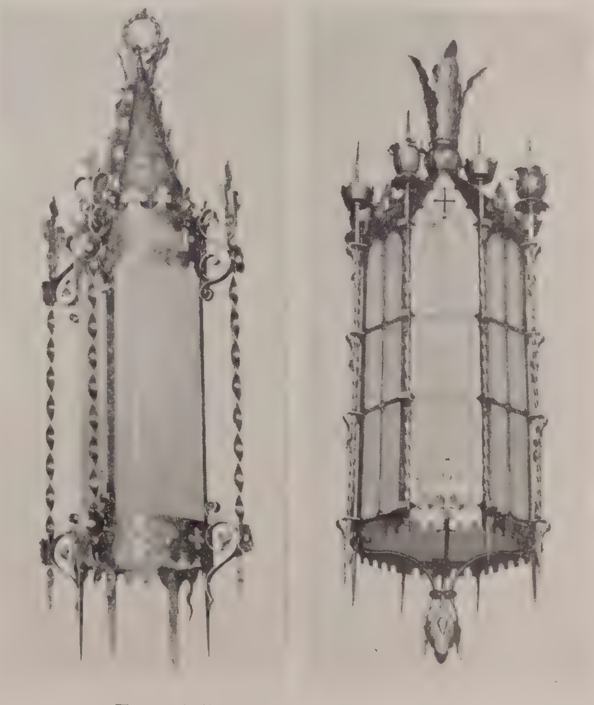

A
B
SIDE AISLES
C
S.A. ALTERNATE
D
OUTSIDE
E
SANCTUARY BRACKET
F
G
VESTIBULES
H
CONFESSIONALS
I
BRACKETS
PROPOSED · FIXTURES · · ST · AMBROSE · BALTIMORE · MD · · REV · HUGH · J · MONAGHAN · S · T · B · · PASTOR ·

"Presentation Strip" Showing Fixtures for an Entire Installation
Maginnis & Walsh, Architects

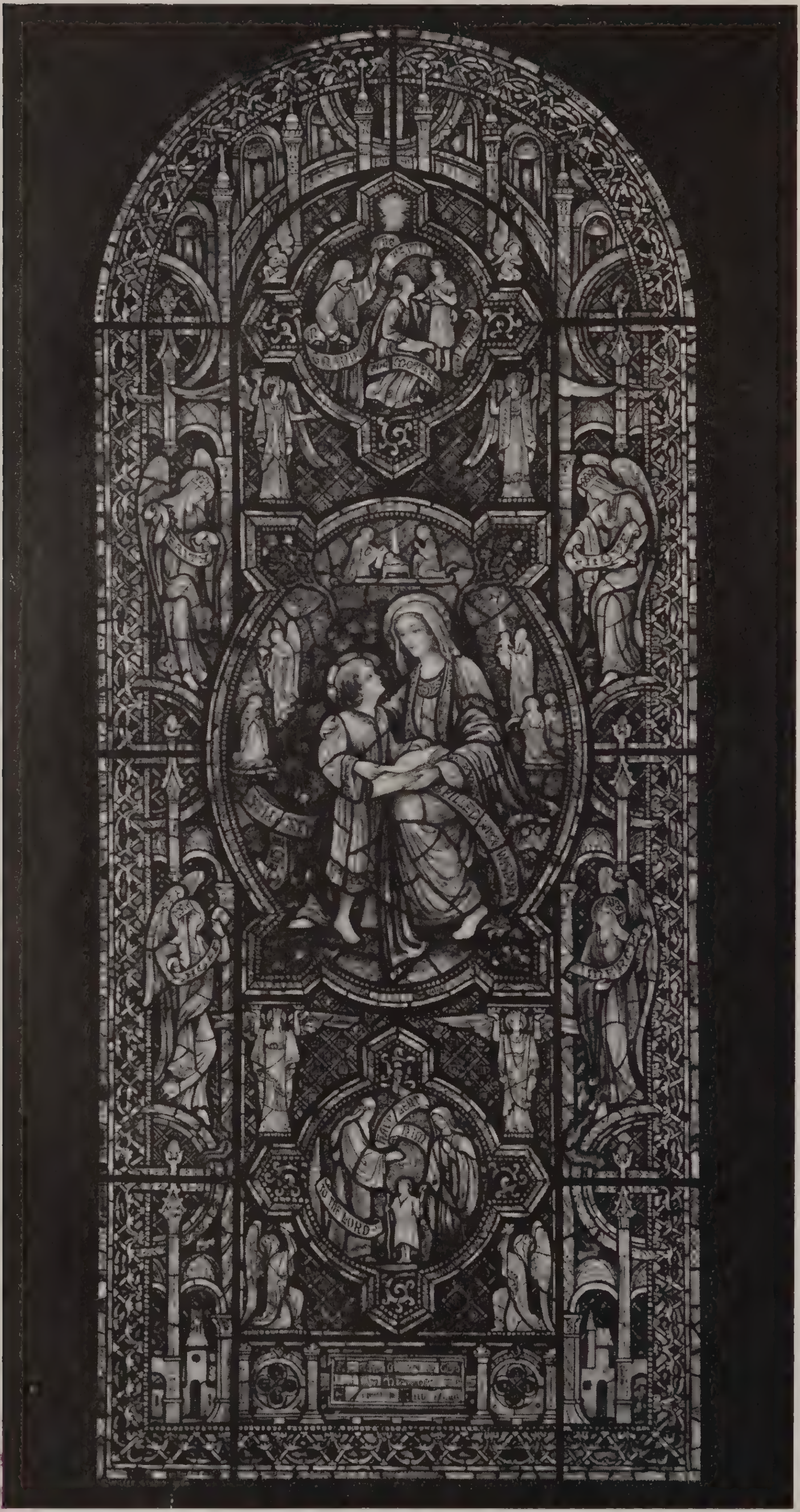
effects the necessary illumination for the walls and ceiling. A four-cylinder design having a vertical dimension proportional to that of the nave of the chapel of the University of Chicago exemplifies the impossibility of avoiding point brightness on the glass by any means other than the distribution of bulbs within the cylinders. Likewise, in a fixture where the form is controlled by its symbolic meaning,—as at Christ Church, Cranbrook, Mich.,—it seems well worth while to sacrifice light as a utility in the strict sense for so fine an ecclesiastical expression. However, it is only a small economic loss when many small bulbs are substituted for few of a high wattage and of longer life. The quality and efficiency of the light depend upon the excellence of the diffusing glass.

Another example of religious form adapted to modern lighting is illustrated in the fixture which uses a mediæval sanctuary lamp prototype such as in St. John the Evangelist's Church, Brooklyn. The central bell contains a stock reflector which sheds light directly to the readers and is surrounded by a ring of exposed lamps placed on the inner circumference so that they are chiefly screened from the eye by the ring and by the bell. They may be readily replaced and, as the architects express it, they frankly make no pretense of being anything but frosted bulbs. Ostensibly, this ring of light counteracts the violent contrast between the bell reflector and its illuminated bottom. The added general illumination was not so much the object of this ring, however, as were the many high-light possibilities which the profusion of bulbs afforded.

The subject of sanctuary lighting is even more specialized than that of the nave. Light enters into the treatment of such features as the altar, pulpit or choir to give emphasis. Perhaps the most common weaknesses lie in the realm of theatricality or in the grave error of considering the reactions of the congregation to the neglect of those of the clergy. When so much of the finest church craftsmanship has been dedicated to the sanctuary, where it manifests itself in fine detail and nuance of materials, tradition would seem to give even greater importance to the sanctuary than to portions without. It would seem only just, therefore, to avoid the suggestion of mechanics from the point of view of the clergy even more than from the point of view of the people.



Typical "Parallel" Church Fixtures
St. Ambrose, Baltimore Church, Bernardsville, N. J.



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A MODERN STAINED GLASS WINDOW SHOWING THE IRON FRAMEWORK CONFORMING TO THE LINES OF THE DESIGN

HENRY LEE WILLET, DESIGNER

THE PRACTICAL CONSIDERATION OF STAINED AND LEADED GLASS

BY

HENRY LEE WILLET

HAVING to meet legitimate demands is often a boon to any art or craft; it is especially true in the case of stained and leaded glass. The mediæval glass workers, limited as they were by their materials, palette and sizes of their sheets of glass, and hampered by the crudeness of their tools, realized the architectural limitations of their medium and wrought triumphs of color which have been the glory and the inspiration of succeeding generations. As the workers in glass became more skilled they lost sight of these limitations and stained glass deteriorated, until during the seventeenth and eighteenth centuries churches were filled with windows whose only claim to excellence lay in the ingenuity which directed their making. In this country, in the latter part of the last and the beginning of the present century, the lowest depths were reached through the rise of what might be called the "opalescent" school, whose pride and glory was to see how pictorial and realistic a window could be made. Leaded glass (by that I refer to an ornamental design, usually a geometrical pattern without any painting, such as is used in houses, banks, stores, etc.), being for the greater part mechanical work, went the downward path even more quickly, considering the length of time during which it was used.

Architects are most particular in knowing all about the foundations of their buildings, the concrete, stone, or steel that is being used, but when it comes to stained or leaded glass, through a lack of technical knowledge of the subject, the contracts are very often awarded to the lowest bidders, "regardless." Instead of the conscientious craftsman, the clever bidder is frequently selected, and the more clever the latter is the more the windows bag and leak, the more the paint and enamels peel off, and the more the glass comes out of the narrow-gauge leads. Such windows are in constant need of repair, all because there are no architectural specifications to force the unscrupulous glass man to toe the mark. That the conscientious craftsman has not gone the way of the dodo has been due to the fact that some architects are exercising careful discrimination and are demanding work that is not only well designed, but also properly made.

Specifications for Stained Glass

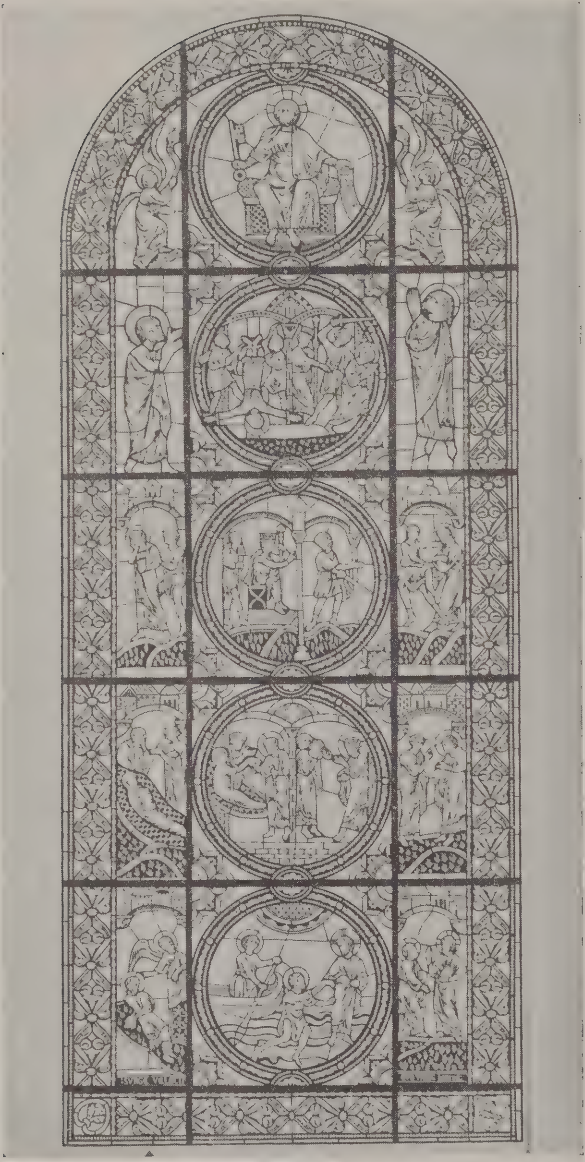
By requiring that these specifications be filled, the architect will insure that the materials and craftsmanship are what they should be.

Glass. Statement of type of glass required; antique, imported or domestic; cathedral, double-rolled or hammered; seedy flint; crystal plate or double-A window glass. The finest colored glasses are the hand-blown pot metal English antiques and Norman slabs, having more life and sparkle than the German antique glass, which is generally very even and flat, or the domestic, the quality of which is not always the best. The cathedral glasses, being rolled instead of blown, have a rough surface which helps diffuse the light, and they are therefore used with success in diamond or quarry work where one has large pieces of glass. Seedy flint, a very "bubbly" glass, is also good for the same purposes.

Lead Cames. Milled lead cames should be required. The heart and inside of the flange, being milled like the edge of a coin, makes a better surface for the cement to adhere to. The width of the flange should be specified; except in special cases no came under ¼-inch size should be used. Where there are large fields of diamond quarries and such repeating shapes, ⅜-inch or ½-inch cames are the best. Cames with strong, heavy flanges should be required. Thin flanges cut down on the lead cost, but they also cut down on the rigidity of the window, the glass works out of the lead, and the flange gives way just beyond the soldered joint. As the joints are the weak points, they should be floated and not skimped.

Reinforcements. First of all, I should like to call attention to a fallacy of using reinforced lead cames. The metal bar in the heart of the lead can hardly be made of sufficient size to obtain the desired rigidity; it cannot be anchored to the groove or rabbet as securely as a supporting bar, and in many places where it is used it does not extend without a break the entire width of the light and so is quite useless as "reinforcement." Windows should have horizontal supporting bars at least every 2 feet. For openings of up to 2 feet in width, use should be made of round bars ⅜-inch in diameters or flat bars ⅜ x ⅛, of course soldered at right angles to the surface of the light and not flat, such as I have seen in some cases. Openings between 2 and 3 feet in width should have ½-inch bars. Lancets over 3 feet in width should be equipped with an iron framework planned to suit the design of the window, such as is suggested in the sketch.

Cementing. The cement, which in this case is a semi-fluid putty made of whitening, boiled linseed oil, litharge, red lead, dryers and lamp black, should be of the best materials properly mixed, carefully forced under the flanges of the lead on both sides. The lights after cement is applied



Window, Lyons Cathedral. Heavy Lines Show Iron Supporting Frame

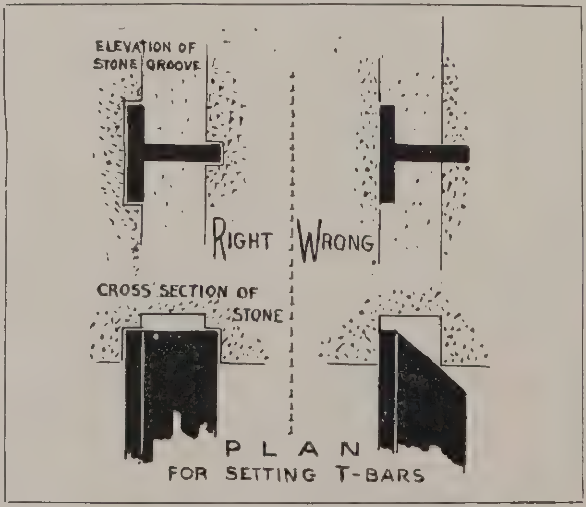
should be allowed to stand and harden for at least a week before their installation.

Setting. If the panels go in a stone groove or rabbet and are to be set with putty, which I personally advise, the groove or rabbet should be painted with a white shellac, or, if they are to be set in cement, the stone should be dampened with water. In all cases the panels should be bedded in putty or cement and not placed first and then have the putty or cement put in around them. The best linseed oil putty should be used, and in the use of cement, care should be exercised not to mix in too much plaster of Paris in a desire to make the cementing smooth, for this tends to make it draw away from the stone, causing the window to leak. The panels should be plugged to hold them rigid in the groove while the putty and cement are hardening. The stone or wood should be notched to hold the supporting bars in place.

Metal. Condensation gutters are very helpful, especially for windows that have large openings. They are placed at the bottoms of the lancets, and any moisture that forms on the inside of the window is caught in this gutter and passes out through small openings to the outside, thus keeping the stone and plaster on the inside from being stained.

Ventilators. The stained glass man hopes for the day when forced ventilation shall be universal and "saints and sich" will not be cut in half, their parts left dangling in the air with no visible means of support, when the window ventilators are opened. The designer of the glass should provide for the necessary ventilators, so that the value of the design is not ruined when the ventilators are open. This can often be done by the use of medallions. Till then only such ventilators having the detachable inside frames should be used. For some reason, people refuse to open and shut ventilators in the manner for which they are equipped; they insist on pushing on the glass and slamming the ventilator open or shut, with the result that all ventilators in time need repairing which can be done much more expeditiously and cheaply if the inside frame is removable. Ventilators should be equipped with horizontal supporting bars at least every 8 inches. When casements are installed, use should be made of those with slip pin hinges, where possible, and these should be equipped with horizontal bars adapted to the design of the glass.

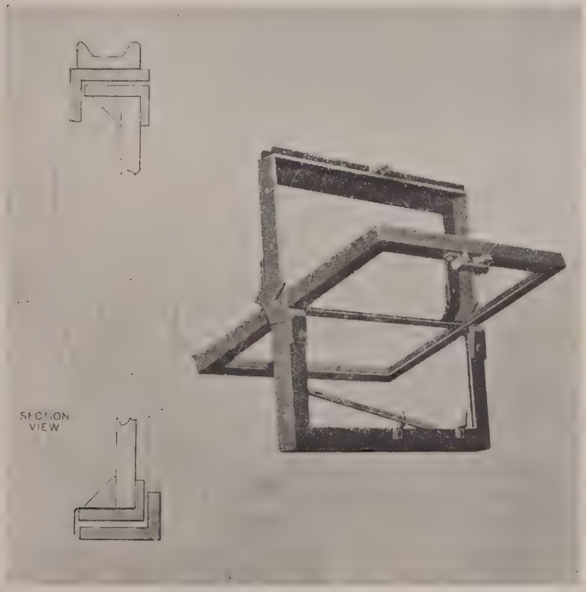
Design and Cost. Preferably, there should be given a statement of the price limit, or else a general description of the type of design desired. The reason for this will be quite obvious, if one will picture going to a dozen architects of varying



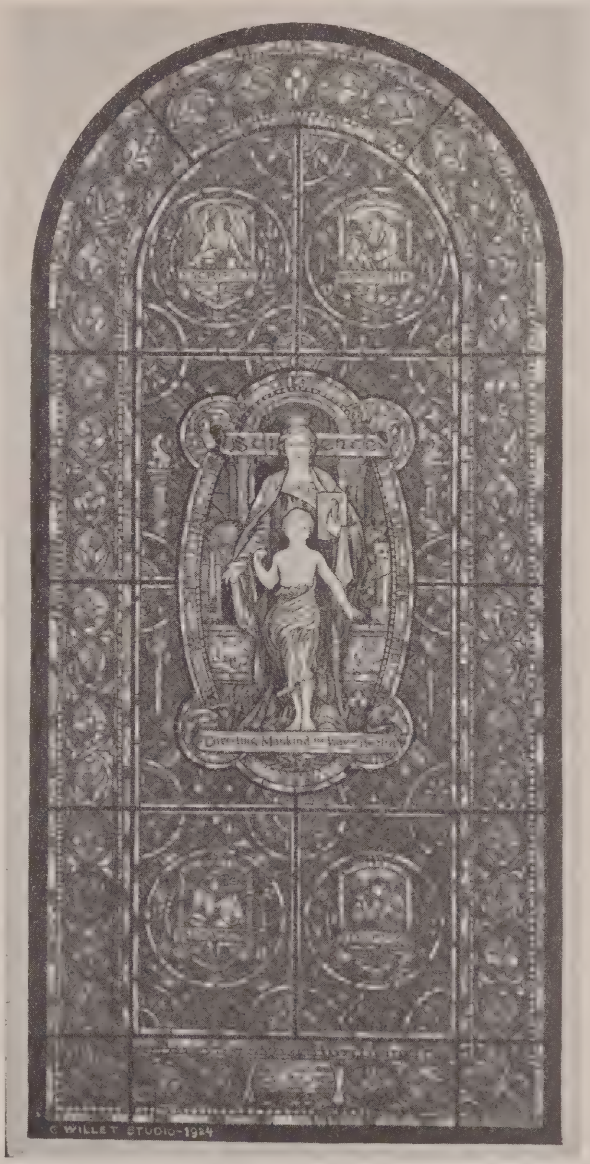
The Right and the Wrong Methods of Setting T-Bars ability with a blue print of a plot of ground and asking them at their own expense to submit sketches of their ideas of the proper kind of Tudor house for that plot. One might design a $200,000 house, the next a house for half that sum, and so on down to a $15,000 house. Fortunately, the American Institute of Architects keeps architects from being so foolish, but this is exactly the amount of information given stained glass artists by 90 per cent of the architects, and about 99 per cent of the artists are foolish enough to go ahead blindly and make sketches on such an insufficient basis.

Stained Glass

By stained glass is meant windows stained and etched after the manner of the mediæval glass artists, usually containing figures or groups of figures. This type of work should not be included in the general specifications, but should be handled directly by the architect and his client. In church work this does not mean a committee of eight individuals including the Mrs. John Smiths who studied art appreciation in the finishing school days back in the gay nineties and then promptly forgot everything except that Titian became a moral degenerate after his second marriage,—"or was it Rembrandt?" Instead there should be appointed a committee of not more than three individuals who will take time to reasonably inform themselves and study the work *in situ* of not more than half a dozen stained glass artists, whom the architect has recommended, retaining the man they feel is most capable of handling their problem and having him make sketches and propositions. If satisfactory the committee should give him the commission to execute the work; if not, the committee should retain another in the same manner. This will call forth an artist's best efforts, this dealing with him as an individual; but if a competition is required, after studying the work of the various men, selection should be made of three to prepare designs, giving them all the same information, and setting a time when the competition definitely closes. Extension of the time is usually to allow one of the competitors an opportunity to complete designs for another commission, which the other competitors had passed up, really believing that they had to have the designs for a particular competition in at the time set. The unsuccessful competitors should receive a reasonable remuneration for their efforts.



A Type of Ventilator Having Detachable Inside Frame



A Modern Example, Iron Framework
H. L. Willet & A. L. Willet, Associate Artists

All the specifications under leaded glass are applicable for stained glass, but should be supplemented in this way:

Under-glass. Where flash glasses are necessary for etching, specify that they be antique. Flash glasses are obtained by the glass blower dipping first in a white or other colored glass and then in another color. When blown, this gives a thin layer of the second color over the white or other color. This thin layer can be eaten off with hydrofluoric acid where desired to form designs, etc., of two colors in the same piece of glass. It is especially useful in heraldic work. Domestic flash glasses are very flat, and the white glass used being perfectly clear, is often somewhat lifeless.

Under-leading. By varying the widths of the lead cames, the design can be brought out. The proper use of wide leads aids greatly to the virility of the design, as the blacks in stained glass give that jewel-like quality to the other colors.

Reinforcements. T-bars should be introduced at least every 2 feet; for lancets of up to 2 feet in width, ¾-inch T-bars should be used; for lancets between 2 and 3 feet in width, 1-inch T-bars. The stone or wood should be cut out so that the vertical flange is flush with the stone or wood, with at least a ¼-inch catch on either side.

Painting. It is best to allow no enamel colors to be introduced, as they are not permanent. The only legitimate color is the opaque mineral stain, used to make the trace lines, such as the features of faces, drapery lines, etc., and also used as a mat over the glass for shading. There is also a silver stain, which when applied to certain "white glasses" colors them gold and is permanent and especially useful in canopied windows. These mineral colors must be fired in the kiln with sufficient heat to fuse them into the surface of the glass.

The height at which the window is to be placed should not only be taken into consideration in connection with the design, but also in regard to the trace lines which should be made of sufficient width to carry distinctly to the beholder's eye when the glass is in place. That does not mean that they must be grotesque. Copying the archaisms of the twelfth and thirteenth centuries is not necessarily art.

Other matters which the architect controls that relate to stained glass need careful attention. One is the regulation of the size of the groove in which the glass is to be placed. The ideal way is to have the groove up one side of the lancet 1 inch deep and ½-inch wide, and on the other side ½-inch deep and the same width. The glass sections can then be bound with a ½-inch lead, allowing a full ½-inch catch on both sides and bringing the glass flush to the edges of the stone. By placing the panel in the inch groove first, there is no need to force or bend the panel, which of course weakens the leading. In Gothic window frames with cusped heads, the groove in the cusp should be cut back as deep as the widest part of the opening above the cusp, to allow the free passage of the head of the section. A piecing joint through the glass at this point very often does not fit in with the design of the window and always destroys the vertical uplift of the lancet and the gracefulness of the cusp. The grooves in the cusp of the tracery openings should also be cut back.

Avoid the use of protection glass if possible. As a protection it is a poor insurance premium . . . considering the original cost and the cost of replacement. If the money were put in a fund and left at interest, there would be more than enough to cover any breakage that might not have happened had protection glass been used. As the largest proportion of the breaks to windows are in or around the ventilator sections, which the protection glass would not prevent, there would then be funds to repair these. Finally, the outside appearance of a building is marred when protection glass is used. Wire guards are so horrible, both from the effect outside and also the shadow on the glass inside, that I shudder even to mention them. There are, however, two advantages that are obtained from use of protection glass; it does help to keep the noise of the street out, and the heat in, but if it must be used for these causes, it should be called "storm glass" or "glass silencer,"—anything but "protection glass," and if at all possible, the architect should consult the artist who is to execute the stained glass, so that the dividing lines and ventilators can be placed to work in with his composition.

It is usually best not to divide the work in one building among half a dozen stained glass artists, for I have yet to see any building that has benefited from having the work of many. I believe the architects who now advise it refer to the windows in the cathedrals of France and England, but as yet I have failed to learn that these same architects, with the precedents of these same cathedrals, are turning over the transepts of the cathedrals on which they are pouring out their souls to other architects,—much less dividing the nave among three others to design the side aisles, triforium and clerestory.

Finally, the architect should give the glass craftsman at least as much time to execute his work as is needed by the stone man and plasterer. Instead of waiting until the building is well under way, the architect should acquaint his client from the very beginning, when the cost of the building is being discussed, with the cost of the windows they have in mind will be. Then they will be able to change their idea, or at least be in a position to get what they want, and not expect to get costly figure windows at the price of leaded diamonds,—or, worse yet, (which very often happens) find some stained glass man who will offer to do that.

CHURCH HARDWARE

BY

JOHN R. SCHOEMER

THE sources of modern designs in church hardware are the ring handles, rim locks, studs and strap hinges of mediæval churches. We have many of these models on view today in our museums and private collections, and there are excellent books illustrating the work of these early craftsmen.

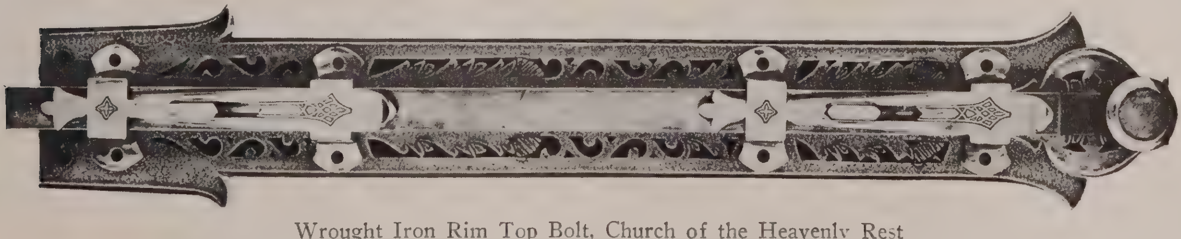
Ring handles were first used as pulls or door knockers. Later it was found possible to connect the ring handle with a rim lock to actuate a dead bolt or a latch bolt. Infinite time and patience were spent on the intricate mechanism of these rim locks, and they defied the skill of the pilferers and marauders of that time. They were wrought with great care in box-like shapes with fine incising and delicate appliques. Strap hinges, in those days, were actual supports for the door, terminating in pintles which fastened to the stone or wood jambs, being forged of heavy gauge iron. Their function is the same today in high class work, but a false strap hinge is now in vogue which adds nothing to the strength of the butt.

We are emerging from a period of outer darkness in the design of church hardware, and we owe our gradual enlightenment to the efforts of architects of the type of Ralph Adams Cram and the late Bertram Grosvenor Goodhue. Twenty-five years ago, ready-made hardware marked "Gothic" at the whim of the manufacturer's designer was the only thing available. Elongated vertical escutcheons with door knobs of brass, bronze or cast iron were the fashion of the day, and the finishes embraced verde antique, statuary bronze, dull brass, and cast iron in the now familiar Bower Barff finish. A later development brought us white metal or white brass, which when treated with black oxide and buffed presents a fair imitation of iron. For beauty of form and softness of texture, there is no substitute for Swedish iron or high grade American, wrought by hand in the forge. The metal itself is so workable that blurred outlines can be brought out by filing; buffing will impart any degree of polish.

The archenemy of iron, of course, is rust. Design and line are soon obliterated by exposure to the elements, and damp or seaboard climates work particular havoc. This, however, should not discourage the would-be user, for if the iron is lacquered at the forge, and after permanent placing is treated with applications of boiled linseed oil or according to some good oil formula, rusting can be postponed indefinitely. These oil treatments may be made with decreasing frequency as the metal begins to absorb the oil. Various methods of rust-proofing are now in use, but nothing has been discovered which will preserve the appearance of natural iron and permit polishing. Experimenting with stainless steel and various alloys has proved unsatisfactory, as they will not weld in the forge. Dipping the metal while warm in oil produces a black finish, but neither this nor the use of acid paint to simulate rust is appropriate for the finer forms of iron.

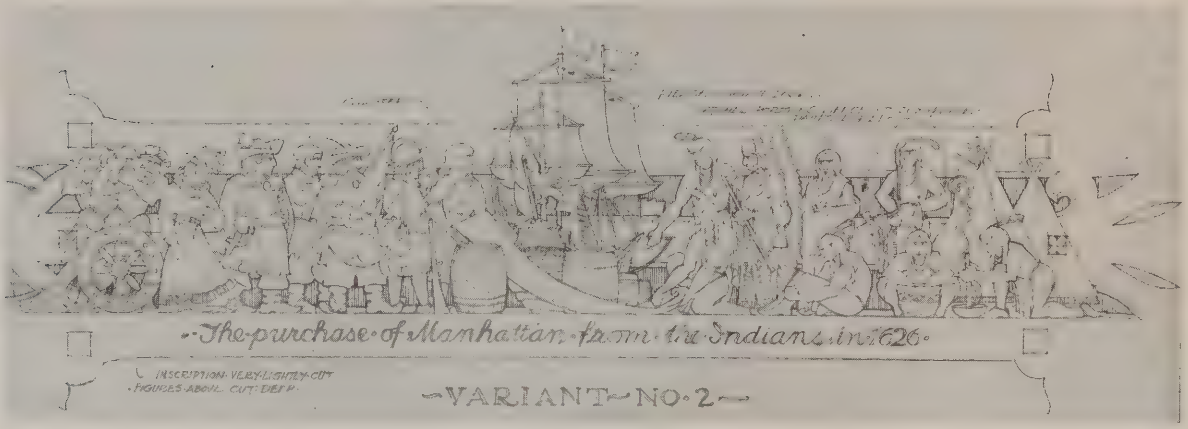
The burden of designing wrought iron hardware, which was formerly borne by the manufacturer alone, is now shared by the architect, and draftsmen are showing increasing skill in the adaptation of old models to present-day conditions. One phase of the genius of the late Bertram Grosvenor Goodhue was the rapidity with which he could create, on paper, designs of great beauty and intricacy. This interest in hardware on the part of the architects is very desirable, and while there are no hard and fast rules for the preparation of special hardware drawings, a few suggestions may prove helpful in reducing the cost of both manufacture and application.

Detailing Hardware. Before completion of the scale and full-sized details of the doors, it is wise to secure the criticism of an expert in hardware and incorporate on the details any resultant notations. Careful consideration should be given to door stiles, and if blocking (sometimes referred to as a "Dutchman") is necessary, its size and location should be indicated. The draftsman preparing the hardware drawings should have some knowledge of the forms best suited to iron. Labor costs may be reduced by slight and unimportant



Wrought Iron Rim Top Bolt, Church of the Heavenly Rest

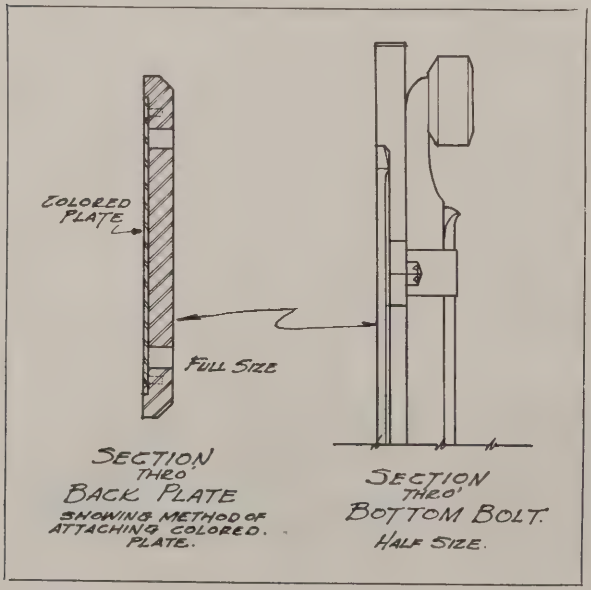
Mayers, Murray & Phillip, Architects


The purchase of Manhattan from the Indians in 1626
INSCRIPTION VERY LIGHTLY CUT
FIGURES ABOVE CUT DEEP
VARIANT NO 2

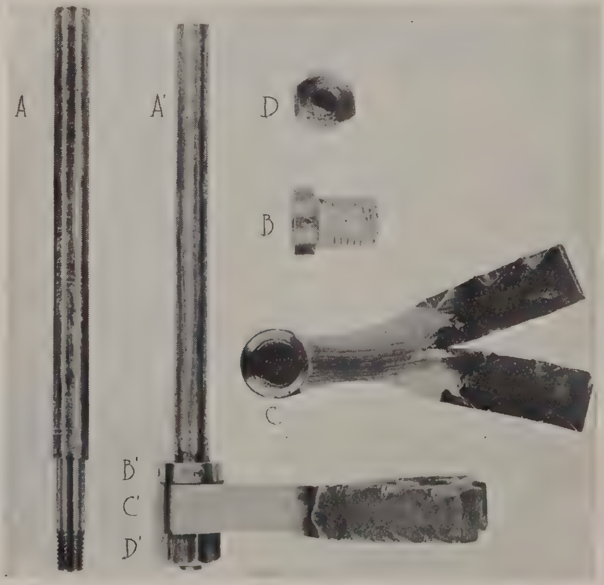
Working Drawing, Strap Hinge, Main Door, Church of the Heavenly Rest
Mayers, Murray & Phillip, Architects

changes in the design by one who knows. Rim locks and escutcheons have cylinders, ring handles and thumb pieces in certain fixed positions to properly operate the mechanism of the locks. The proper location of these should be indicated on the design, but only after consultation with one familiar with lock construction, who will assist in the addition of figured dimensions. While it may seem useless repetition of detailing, it is well to indicate in full size the door stiles and jambs on the hardware details. Errors will frequently be detected in this way, and as the blacksmith consults the drawing while forging, an intimate knowledge of actual conditions is helpful. Hardware drawings should also be sent to the woodworker, as they assist him in the use of the material.

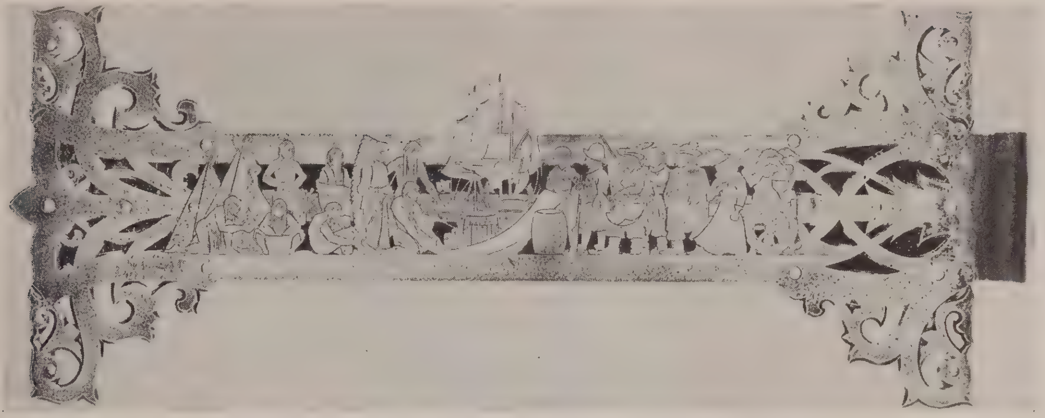
On the wrought iron hardware for the Church of the Heavenly Rest in New York (Mayers, Murray & Phillip, architects), the addition of color was used to emphasize the delicacy of the design. Red leather was first considered as a background under the pierced metal, but was abandoned as impractical, and red pyroxolin lacquer applied to a removable back plate was adopted. The main plate was routed for the color plate, and the slight additional thickness in the metal is not offensive or apparent. Models frequently assist in securing a desired effect in wrought iron. For the Church of the Heavenly Rest, the strap hinge "Sale of Manhattan Island" was chased and incised to portray the picture. The result was a flat and uninteresting surface with no emphasis on foreground figures. To obtain a different effect, objects were then cut out of cardboard, colored to match the iron, and glued to the hinge. The result was most gratifying, and the finished strap will have an additional plate welded to it containing the figures and ob-


COLORED PLATE
FULL SIZE
SECTION THRO' BACK PLATE SHOWING METHOD OF ATTACHING COLORED. PLATE.
SECTION THRO' BOTTOM BOLT. HALF SIZE.

Detail of Routing for Color Plate which Shows Through Piercing in Back Plate



Adjustable Hinge Pintle for Stone Jambs Facilitates Door Hanging and Operation



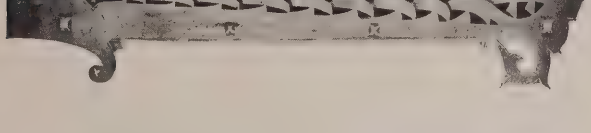
Finished Strap Hinge, Church of the Heavenly Rest
Mayers, Murray & Phillip, Architects

jects of the scene. This idea could be further developed in strap hinges by the use of three or more plates welded together and associated as: A—color plate; B—main plate containing background objects; and C—foreground plate.

Hinge pintles were formerly installed when the church was nearing completion by removing stones in the jamb or drilling large holes for insertion of the pintle leg,—a costly and unsatisfactory procedure. This can be avoided by preparing a pintle location drawing, indicating pintle heights and projections for the stone mason. A recent development is the adjustable pintle with all parts easily assembled. The leg is set in hot lead in a stone course during construction. The pin is removable, and the adjustable threaded washer forms the knuckle bearing. The locking nut at the bottom securely fastens the pin and washer to the leg. The advantages are easy installation and assurance that all pintle legs are carrying their share of the door, an important consideration because of the weight and width of all outside church doors.

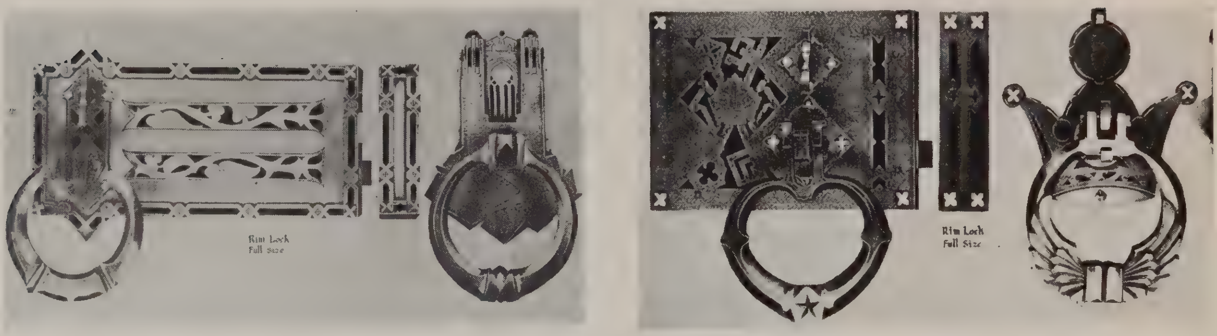
Appropriate hardware for various church doors is governed somewhat by actual conditions, but generally is identical as to type and function. The suggestions offered here are suitable for Gothic churches, but slight alterations in the text will make them apply to all styles. Main entrance doors are usually heavy and somewhat difficult to operate, and too frequently the hardware does not relieve the situation. Two or more strap hinges are suitable for each door, the considerations being the lateral pull as affected by the door width, door height, and thickness. Rim locks with cylinder operation are most effective for use on the main doors,—the cylinder on the outside concealed by a cylinder cover attached to the escutcheon or applied as a separate unit. The dead bolt in the lock should be operated by the key from the outside and by a thumb piece on the lock. The latch bolt is operated by the ring handles from both sides. The use of the dummy ring handle is discouraged,—it is unnecessary, expensive and deceptive, as it retards one in operating the door. In former days two ring handles were used on the outside, but they were then placed in the center of the door for use as pulls. On less important outside doors it is sometimes desirable to substitute horizontal mortise cylinder locks which blend with the appearance of the rim locks on the outside. The inactive door is usually locked by top and bottom rim bolts, or, on minor doors, top and bottom mortise flush bolts. Ornamental door stops and hooks of wrought iron are attractive in appearance as well as necessary.

Reverting again to the size and weight of church doors, one concludes that not enough consideration is given to the large feminine proportion of the church-going public. It is frequently impossible for women or children to open such doors. For that reason, entrance doors should



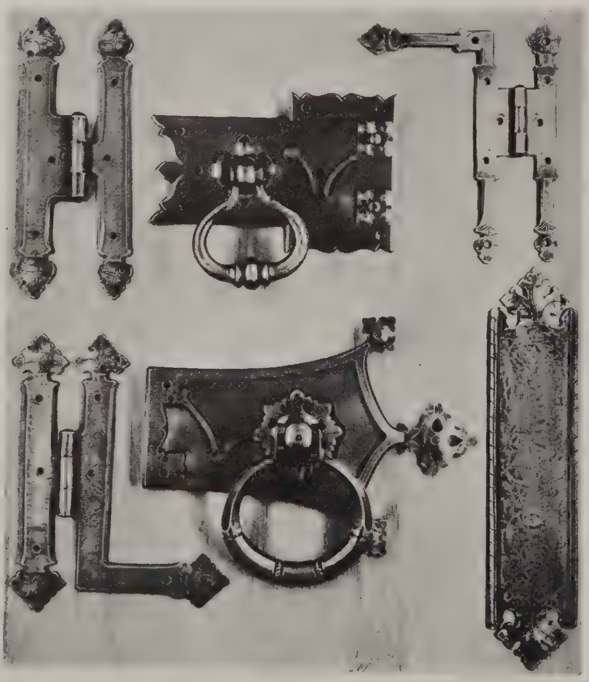
Strap Hinge for Minor Exterior Door

Stock Rim Lock and Ring Handle



Rim Locks and Rim Handles for Main Exterior Doors. Church of the Heavenly Rest
Mayers, Murray & Phillip, Architects

be hooked open at the beginning of services and closed only when the church is not in use. Secondary storm doors should be provided immediately within the entrance doors, thus serving to keep the vestibule or narthex warm in cold or inclement weather. At the Church of the Heavenly Rest, sufficient space is provided so that the storm doors form one side of a small vestibule, but actually very little space is required for their installation. A single-acting checking floor hinge is recommended for each inner door with ornamental push plate, door pull, and foot-operated door holder. Where the inner door is hung close to the outer, double-acting checking floor hinges are more desirable, and by the addition in the head of an adjustable metal stop they can be made single-acting, swinging into the narthex. This permits of a rather flexible operation and, if necessary, compliance with local fire laws.



Rim Locks, Ring Handles, Surface Hinges and Push Plate. Parish House, St. John of Lattingtown, Locust Valley, N. Y.
Henry W. Rowe and Waldemar H. Ritter, Associated Architects

Narthex screen doors and nave aisle doors may be hung on single-acting floor checks and equipped with door pulls, push plates and foot door holders. If the narthex forms a passage to other parts of the building when the church is closed, it is suggested that cylinder dead locks be incorporated as part of the hardware. Again conceal the cylinders with a cover, and the thumb piece may be made ornamental and attractive. Minor doors to sacristy, chancel, or rector's study may be treated to suit the taste of the architect and the funds available. However, if the door opens into the nave, strap hinges, rim locks and ring handles can be made to blend into the general design in a most attractive way. An illustration is shown of an inexpensive rim lock with escutcheon and ring handle. If economy requires the use of a mortise lock, select the horizontal type with its correspondingly placed escutcheon and knob or ring handle. Convenience and utility recommend the use of cylinder locks. They are flexible as to master key requirements, and on both the rim and mortise types they offer security and easy operation. Old rim locks in our museums have keys from 6 to 12 inches long, and it was considered necessary until recent years to design locks in like fashion. Master-keying is most desirable and useful for the sexton or rector and should always be a part of the hardware equipment, as the additional cost is slight. The whole question of church hardware resolves itself into the intelligent selection of appropriate high grade material, with due regard to both use and beauty.

The character of almost any building, of course, is largely given by its hardware, but this is true in a particular degree of a church. After all, the most costly hardware likely to be used for a church represents but a small proportion of the building's total cost, and yet there are few details for which adequate expenditure is more amply justified in giving a high architectural character.

HEATING AND VENTILATING OF CHURCHES

BY

ALFRED J. OFFNER, M.E.

OFFNER & McKNIGHT, CONSULTING ENGINEERS

WHEN man became conscious of the existence of a Supreme Being and started to bring offerings to his God, he piled up a few stones on which he placed his sacrificial gifts. Then, to protect his offerings against the elements,—the hot sun, the winds and rains,—he placed his altar in a cave or erected a rude covering over it. So, no doubt, the first house of God was built. As mankind developed in knowledge and increased in numbers and became tribes, and tribes became nations, and as groups of people became villages and villages became cities, so caves containing sacrificial altars became tabernacles, and tabernacles became temples. As the people and nations grew in sizes and riches, so the temples became larger and more elaborate.

While houses of worship have been built from time immemorial, the modern heating and ventilating systems as applied to church buildings are of comparative recent development. Nearly all of the world's famous churches and cathedrals, built throughout Europe during the past centuries, have no means of artificial heating or ventilating. But as man demands more and more convenience and comforts, he naturally insists on his houses of worship being properly heated and ventilated. The complexity of modern church construction, the beauty of design, and the uses and arrangements of this type of building, all present unusual problems in the designing of the heating and ventilating systems.

Methods of Heating Churches. Church buildings may be heated by three methods,—stoves, warm air or radiators. Any one of these methods may be used alone or in combination. The type of heating to be used and the method of employing it depend on building conditions and on the amount of money that is available for this work.

Heating by Stoves. With the exception of very small rural churches, this type of heating is rarely used in houses of worship. Heating by this method is not only likely to be uneven but presents a certain fire hazard.

Heating by Warm Air Furnaces. The heating of a church building can be accomplished by warm air furnaces, either by gravity or fan. Heating by warm air furnaces is used in many small churches. In this system the air is taken in from outdoors, passes through the furnace where it is warmed, and then is conveyed to the rooms to be heated by means of galvanized iron ducts and flues. With this system, the distribution of heat is likely to be affected by wind conditions, and the results are therefore not so positive as with radiator heat. While the initial cost of installation of a warm air furnace system is lower than that of either steam or hot water systems, the cost of operation is usually higher, especially if the air is taken directly from outdoors. Therefore, for economy in the use of fuel, a by-pass should be provided to permit the taking of the air direct from the building in very cold weather. This arrangement also permits quick reheating. With a warm air furnace there is nothing to freeze should the heating be discontinued during the week. In larger churches, where furnace heat is desired, a number of furnaces may be located in different portions of the building, thereby reducing the length of the galvanized sheet metal pipes. Electrically-driven blowers may be used in connection with warm air furnaces. Such an arrangement insures positive heat distribution and permits quick reheating.

Heating by Radiators. Heating by radiators may be done by either steam or hot water. In either system, the heat is generated in a boiler and is conveyed through pipes to the radiators located in the various rooms to be heated. Heating by water permits central regulation at the boiler; that is, the water temperature at the boiler can be either raised or lowered according to the weather. This type of heating would not be adapted to those church buildings which are heated only part of the time, as there is the possibility of freezing in cold weather. As a general rule, churches are best heated by steam. This system is especially adapted to those buildings where the heat is interrupted during the week. With this type of heating, portions of the system may be shut off for any desired length of time. It is also well adapted for quick heating up after the building has been without heat for some time.

Arrangement of Piping. If a church has, in addition to the church proper, social rooms, pastor's study, etc., it is always a good scheme to separate, arrange and valve the piping so that the building may be heated in sections. If the space under the nave is a cellar, the distributing pipes are located there. If this space is used for Sunday School rooms, social rooms or other purposes, and there is no space under these rooms, the distributing pipes must of necessity be located in these rooms. Unless the piping is extensive, it is nearly always possible, with a little study, to locate the mains in these rooms and still have them invisible. Fig. 1 shows an arrangement for a one-pipe steam system where the steam main is concealed in a false beam located at the

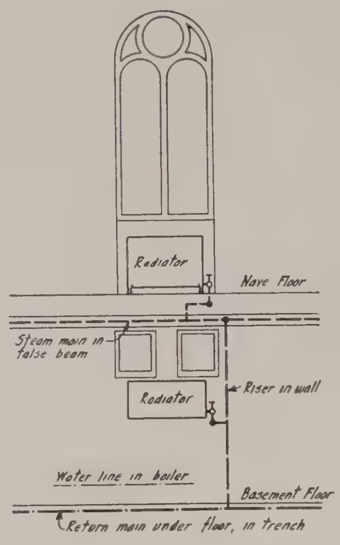


Fig. 1. One Pipe Steam System

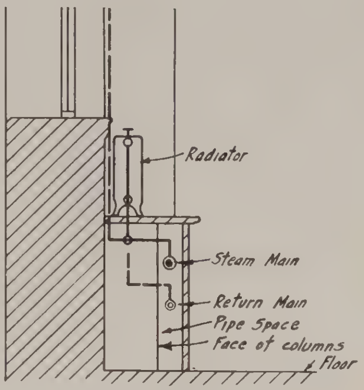


Fig. 2. Two Pipe Steam System.

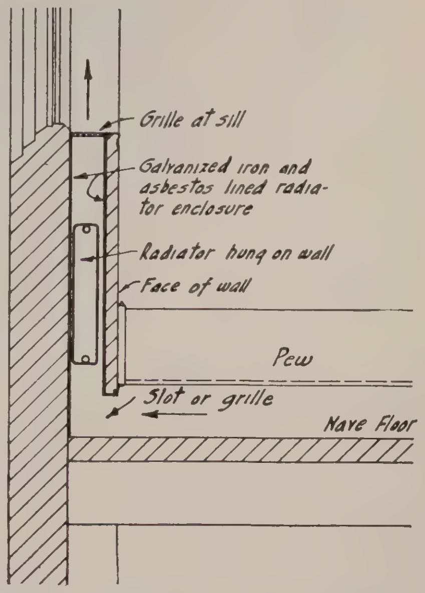


Fig. 3. Method of Concealing Radiators with Pens Along Outside Walls

ceiling, close to the outside wall, the return main being run in a trench located under the floor. Fig. 2 shows an arrangement for a two-pipe system. Here both pipes are located in furred spaces located along the walls, the radiators being placed on top of the shelf formed by these furred spaces.

Locations of Radiators. For lowest cost of installation, highest economy in operation, and for ease in cleaning, radiators should be exposed and be located under windows. When the radiators are to be concealed, proper openings must be provided for the air inlets and outlets. The enclosures should be so arranged that they can be removed for cleaning and repair purposes, and means must be provided to give access to the control valves. In churches which have aisles along the outside walls, either exposed or concealed radiators can generally be located under the windows, preferably in recesses to conserve space. In cases where pews are located along the outside walls, radiators located under the windows should be enclosed to protect those sitting next to them against the heat. Such an arrangement is illustrated by Fig. 3.

Heating by Air. When for structural or other reasons it is impossible to place radiators in the nave, the radiators may be placed under the nave floor, the air being led to and from these radiators by galvanized iron ducts and flues. This arrangement is more expensive to install than either exposed or concealed radiators. The air to the stacks containing the radiators may be taken from outdoors or it may be re-circulated direct from the room. With the first arrangement the cost of operation would be much higher than when the air is re-circulated from the room or when radiators located in the room are used, due to the fact that a large amount of cold air, which must be heated is being taken in. Fig. 4 shows an arrangement where the air is re-circulated. In very large churches, heating by warm air blown into the nave, chancel, etc., by electrically-driven blowers is practically necessary. This method is best suited for heating rooms having large air volumes. It also makes quick reheating possible. While Fig. 5 shows one method of heating a church by air, there are various means by which this type of heating can be applied, depending on the design and arrangement of the building.

Special Treatment of Sanctuary. Due to the sacred use to which the sanctuary is put and to the beauty that is desired, it is nearly always objectionable to place exposed radiators there. In such cases the heating of the sanctuary presents special problems which can be worked out in a number of ways. It is sometimes possible to place radiators in the walls near or adjacent to the altar, the radiators being covered by ornamental grilles which can be made of various designs and materials. If the altar is so arranged that there is a space behind it, radiators may be placed there. Such an arrangement is illustrated by Fig. 6. In this case the radiator is placed in a galvanized iron box placed in the wall back of the altar. The air supply to this radiator comes in through openings, covered by grilles, located on each side of the sanctuary, the warm air being discharged at the sill level of the chancel

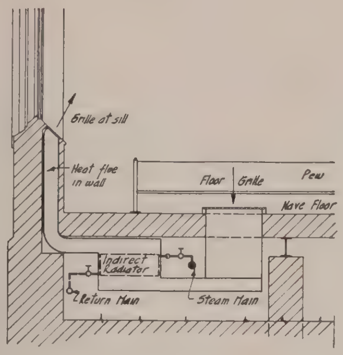


Fig. 4. Method of Indirect Heating for Nave

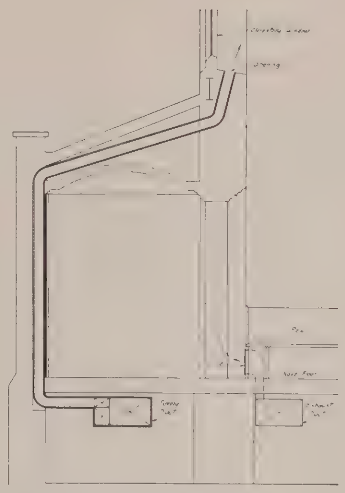


Fig. 5. Heating Large Church with Air

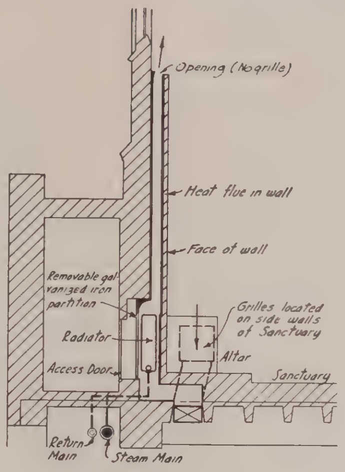


Fig. 6. Method of Concealing Radiator in Back of Altar

window. If there is no space in back of the altar available for a radiator, the radiator may be placed in a galvanized iron box located in the cellar below the sanctuary, and the air to the radiator may be taken in through two floor registers, one located on each side of the altar. The warm air discharge is then carried up concealed in the wall behind the altar and discharged at the sill of the window over it. Fig. 7 shows this arrangement.

In cases of existing buildings in which a new heating system or systems are being installed, there are often strong objections to cutting open the walls or otherwise disturbing the arrangement of the interior. Under such conditions, the heating may be accomplished by using two floor registers, one being used for the air intake, the other for the discharge of warm air. Such an arrangement is illustrated by Fig. 8.

Automatic Heat Regulation Desirable. The radiators in the nave or other parts of a church building can be put under the control of thermostats which will automatically keep the room at any desired temperature, preventing over- or under-heating, and resulting in a saving of fuel. In smaller churches automatic heat regulation is less frequently used than in larger buildings because of the higher costs of installation. In large churches, automatic heat regulation is almost a necessity as well as being always very desirable, and it should by all means be provided if the funds are available.

Is Ventilation Necessary? The question is sometimes asked if a supply of properly conditioned air and the removal of vitiated air by the use of fans is a necessity in church buildings. In smaller churches, especially where the windows are so arranged that they can be easily opened and are located to give cross ventilation, mechanical ventilation is not necessary. The natural air changes obtained in such cases will generally be found to be sufficient. If the windows are fixed or poorly located for natural ventilation, use of a few ceiling openings for the removal of air may be advisable. In larger houses of worship it is often found that the windows, especially those of the clerestory, have very small portions that can be opened; if not, the entire windows are fixed. In such cases the doors giving access to the church provide the only means of admitting air. As this generally is not sufficient, some type of mechanical ventilation must be provided, if only enough to move the air in the building. Such a ventilating system can sometimes be combined with the heating of the church (see Fig. 5).

Churches that have large congregations and long services should have some form of mechanical ventilation. It has often been found in actual practice that, after installing a mechanical ventilating system, air conditions were so improved that a marked increase in attendance was noted. Drowsiness and sleepiness cannot always be blamed on poor preaching, as they are very often caused by inferior air conditions.

Cooling of Churches. The most important problem in producing comfortable conditions during the hot and humid summer months is that of the de-humidifying of the air. The cooling of large rooms during this period of the year, so successfully applied in theaters and buildings in-

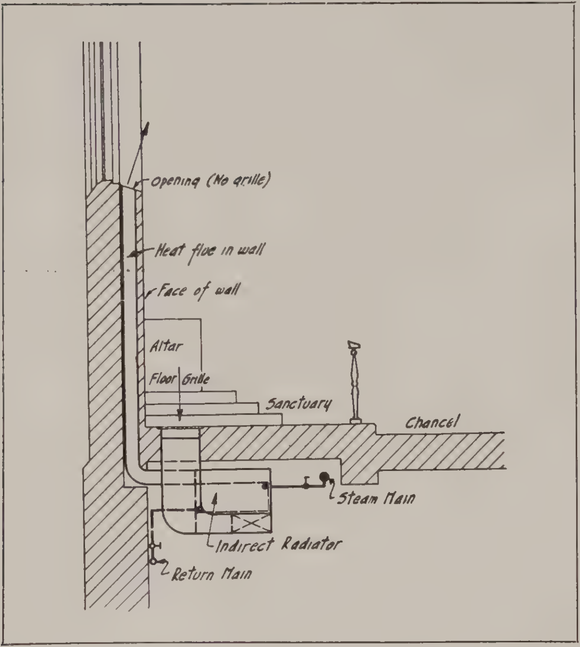


Fig. 7. Heating of Sanctuary with Indirect Radiator

tended for certain industries, can also be applied to church auditoriums. So far, however, with the exception of a few isolated cases, churches have not adopted use of cooling systems, due to the high cost of installation and operation.

Fuels for Church Heating. The selection of the best fuel for a particular church depends upon the type of fuels available. Gas, coal, oil or wood may be used, the choice depending on the cost of the fuel and the possibility of obtaining it easily. Gas, of course, is the ideal fuel for heating boilers, its only drawback being its comparatively higher cost of operation in many localities where natural gas is not available. Gas is clean and noiseless in operation. The size of the flame can be controlled conveniently and automatically and it can be turned on and off at will. Gas requires no labor of handling. When oil is the fuel to be used, the heaviest grades that will burn without pre-heating should be selected, permitting the use of the cheaper grades of the light oils. While the heavy oils are much cheaper in cost, they require pre-heating and a more expensive and complicated oil-burning equipment, and consequently more skilled attention. The type of attendants generally found in churches necessitates use of the simplest system. In selecting an oil-burning system, care should be taken to choose a well serviced burner of reliable make and quiet in operation. As with gas, it can be controlled easily and automatically, and there is no refuse to remove. Oil burning requires very little labor, but it will require servicing from time to time. Coal is the fuel most used in church heating boilers. While it requires storage space, considerable more handling and the removal of ashes, it is generally found to be the cheapest so far as cost of fuel is concerned, although consideration should be given to the saving in labor, saving in space, ease of control, cleanliness and convenience presented by use of the other two fuels. Where bituminous coal must be used, precautions should be taken to reduce the amount of smoke to a minimum to prevent defacing the outside of the building.

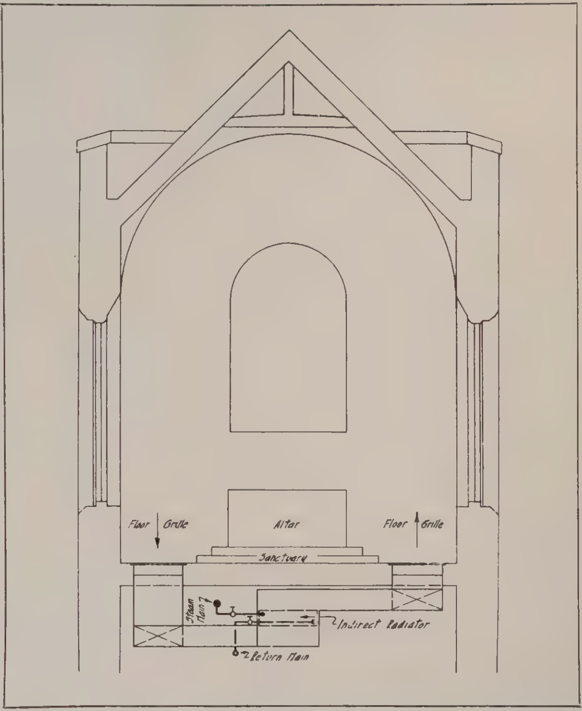


Fig. 8. Indirect Heating of Sanctuary Adapted to an Existing Church Building

In General. In conclusion it should be said that no fixed methods or arrangements can be given for the heating and ventilating of churches. Each building must be studied to determine the system best suited to meet its particular requirements. A system correctly designed and installed will not only give proper results, but will also be low in cost of installation and economical in operation. Pastors and members of building committees should not show favoritism or cater to the whims of certain members of the congregation in the appointment of architects and contractors, but should consider only those who have proved by their work in churches already erected their ability in doing this special kind of work. The designing of the heating and ventilation systems should be planned and supervised by capable and skillful engineers. To have the work done properly will pay in the long run, even if in the beginning the fees for professional services, whether for architect or engineer, may seem high.

WORKING SUCCESSFULLY WITH CHURCH COMMITTEES

BY

C. STANLEY TAYLOR

ONE of the advantages of specializing in architectural practice lies in the accumulation of experience in dealing with a specific type of client. The professional relationship which is an element of architectural practice necessarily involves constant personal contacts and places a premium on the architect's ability to work with all types of personalities and to constantly adapt himself to his clients' points of view. There is a certain similarity between the reactions of clients interested in basic types of building operations. The architect working in the industrial field finds the economic phase of the project of paramount importance and is constantly discussing the dollar side of his designs with every client. The architect working in the small residence field deals to a great extent with worthy housewives whose ideas generally prevail over those of their husbands. The architect working on hospital projects must deal with medical men whose requirements and interests are bound up in sanitation, administration, and related problems.

The architect who works either as a specialist or on occasional contracts in ecclesiastical architecture deals with a different type of client, whose peculiarities and special interests are the subject of this brief discussion. The first distinctive feature about the typical client on church work is that he is not an individual, but a committee of more or less active churchmen who have been selected or appointed to represent the parish or church body. The committee normally includes the head of the church unit itself, whether he be pastor, minister, or bishop; a group of the chief laymen, generally the trustees or deacons or their equivalents, and often a few other members of the parish who are selected because of their knowledge of building operations and success in raising money. Out of this committee there soon emerges a smaller group which shows an active interest and a fair knowledge of the problem, and these members usually constitute the body with which the architect has most of his dealings.

This conglomerate body represents the architect's client. In many respects a church committee resembles any other type of committee responsible for the development of institutional buildings, such as schools, hospitals, or even of clubs. There is one particular in which they generally differ, and that is that the church committee normally recognizes the importance of the purely design aspects of the problem, and at the same time usually acknowledges that these matters are entirely within the province of the architect and that the committee can contribute little to their development. This statement is made without implying in any way that the architect has an entirely free hand in working out his basic designs, for no matter how ignorant committee members may be, there are always some who will profess to have a knowledge of architecture or a sophisticated taste founded upon European travel and will feel themselves competent to impress their views upon the architect's work.

A second characteristic of the typical church committee is that it has a certain amount of money to spend, or possibly only a prospect of securing a predetermined fund, and that when this is spent it has no other money unless additional campaigns are undertaken to meet the deficit. In other words, there is usually a very definite dollar limitation on church work which must be taken seriously by the architect if he wishes to leave his clients at the end of the undertaking in a satisfactory frame of mind. As soon as there is a fixed budget on any type of project, the architect must acknowledge responsibility for adjusting the physical requirements of the structure to the amount of money available. The committee members are not competent to do this; it is distinctly the architect's work.

At the very beginning of the project,—often before the architect is actually engaged,—there is considerable discussion as to the type and size of the church structure, its general accommodations, materials of construction, and the features of its equipment. These matters may be discussed long before cost limitations are finally established, in which case it is comparatively easy for the architect to establish a budget which will allow sufficient funds for completing a structure of the type the committee has in mind. More often, however, the amount of money the parish can afford to put into a church is quite well fixed, but there is no limitation upon the ideas of the more enthusiastic members of the building committee. Then the architect must display both tact and ingenuity in bringing about an adjustment of the requirements and the budget until the two are so related that further work can proceed with reasonable prospect of its successful consummation. There are various ways in which an adjustment can be reached between excessive physical requirements and a limited budget. The first opportunity lies in the adoption of an architectural scheme which is relatively inexpensive to execute because of its compactness, simplicity of plan, ease of construction, and the appropriate use of relatively low cost structural materials. The second opportunity lies in the substitution of inexpensive methods of construction for the finer craftsmanship which ecclesiastical precedent normally demands; and the third opportunity is in developing the project in various stages by planning future units to be erected when funds are subsequently made available through bequests or additional fund-raising campaigns.

The first two methods of keeping within budget limitations involve as definite an appreciation of construction costs as may be required to successfully handle commercial and industrial building projects. They require also an up-to-date knowledge of new materials and methods which are adaptable to church construction, because from day to day experience is proving the worth of new materials for age-old purposes. While both architect and client might desire the floor of the nave to be of fine marble, it is quite possible and entirely logical to achieve the same effect at a fraction of the cost, through the use of marbleized linoleum or cork composition tiles, or the newer forms of rubber flooring which faithfully reproduce the color and pattern of the finest Italian marbles. It is, of course, a fortunate circumstance when an architect is permitted to create a perfect architectural work with carte blanche orders to use the finest materials and the best of craftsmanship, regardless of cost. Only great cathedrals or endowed memorial churches ever present this ideal client situation. The majority of commissions for church work call for restraint and economy without sacrificing beauty.

These practical considerations extend throughout every part of the church structure, but are more particularly important and most easily recognized in the utilitarian items of equipment.

The appointments of a church center may be as complex as those of a Y. M. C. A. building, including a swimming pool, gymnasium, bowling alleys, handball and squash courts, shower rooms, lockers, lounges, and even card and game rooms. Naturally, the architect of such projects is expected to relieve the building committee of much of their responsibility for the solution of technical problems. In these matters, the committee very properly outlines the facilities they desire to incorporate in the structure and the general organization of these facilities for convenience of control and operation. The committee, however, is likely to overlook one important problem which the architect may properly point out to them, and that is the necessity of minimizing subsequent maintenance costs. This matter is quite as important as keeping within a fixed construction budget, for, in fact, maintenance costs are elements of annual budgets that go on from year to year to burden the financial resources of a parish. No material should be employed or no type of construction accepted which will not withstand use and the ravages of time with a minimum of upkeep and maintenance expense.

When all things are analyzed, it will be found that a church problem is not much different from the development of a school building, an office structure, or an intelligently planned factory. There are certain facilities to be provided, certain results to be secured, a definite amount of funds with which to pay for them, and a very real limitation upon subsequent overhead charges. Reconciling these various factors is a problem for the architect to solve in each type of structure. The economic aspects of church construction projects are no less important, though frequently disguised or overlooked, than in the creation of a successful hotel or apartment structure. Perhaps the emphasis that has been placed on the economic aspects of a church project may seem to be unwarranted. The economic factor, however, comes home to the architect very directly when it affects his own fee. Who is the architect really working for? Where are the funds coming from to pay his fees and expenses? With whom is the builder going to contract for the erection of the church? These are very practical questions which the architect must occasionally help to answer.

When first formed, the building committee is an irresponsible body having no legal standing, except the individual liability of its members. Fortunately, most church bodies are incorporated, and the corporate entity appoints the building committee to function as its representative. When such a corporate structure exists, the architect can measure its financial responsibility, can know very definitely its authority for engaging his services, and can seek redress through the courts for any failure to meet its contractual obligations. When there is no such corporate structure in the church body, the architect should endeavor to create a responsible unit which will underwrite all of the expenses and obligations of the project, and standing personally liable for the actions of the building committee. Lacking such underwriting of its expenses, the committee can only function by concurrent action of the church membership, introducing an unwieldy and uncontrollable factor into all negotiations and contracts which are involved during the entire project. The church client must be made legally responsible.

Working successfully with church committees seems to require, therefore, an appreciation of the varied points of view of the important members of the building committee, possession of sufficient tact to reconcile conflicting views, an appreciation of the budget limitations and the subsequent maintenance costs which the church body can afford to carry, and finally, a very practical understanding of the necessity for dealing with a responsible body under a definite understanding.

7.a.

THE ARCHITECTURAL FORUM

IN TWO PARTS

PART ONE

ARCHITECTURAL DESIGN

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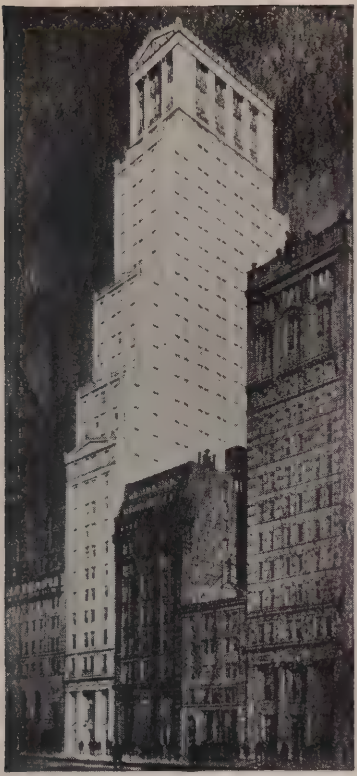

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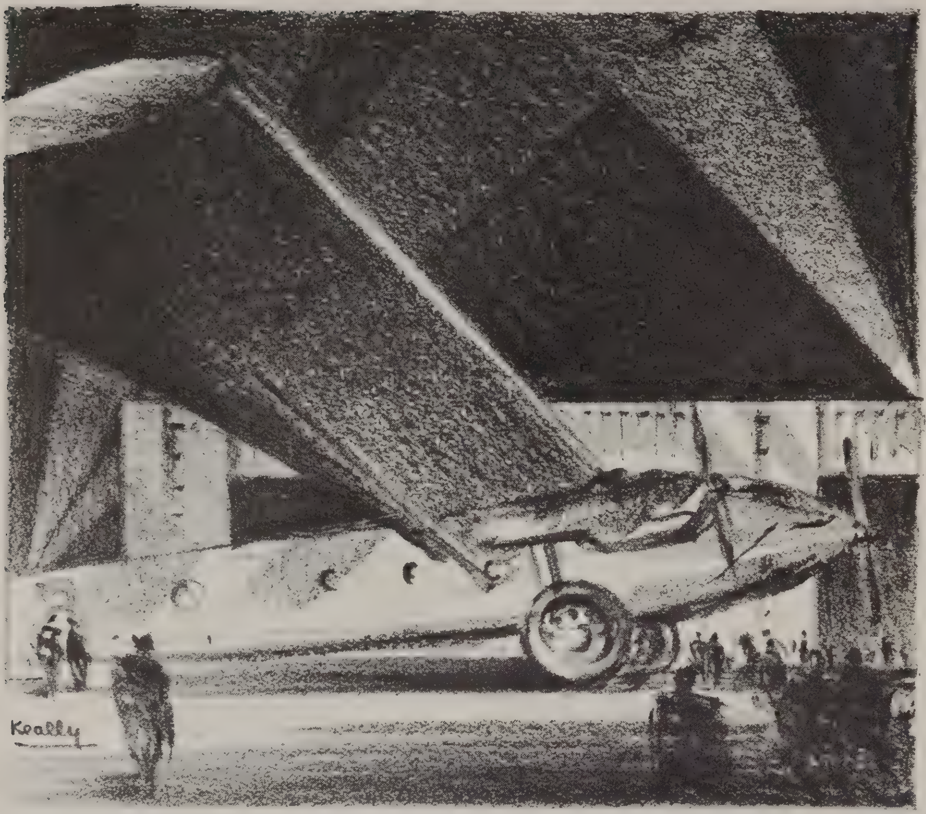

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The requirements of the competition are simple and have been formulated after extensive research and through the cooperative effort of over twenty-five recognized experts in the four fields of architecture, engineering, civics, and city planning, and aeronautics. Harvey Wiley Corbett, F. A. I. A., F. R. I. B. A., is Chairman of the Program Committee and of the Jury of Awards. Francis Keally, A. I. A., has been retained as professional adviser to the competition, which is under the management of C. Stanley Taylor, of Taylor, Rogers & Bliss, Inc. The Program Committee, the personnel of which is presented on the opposite page, has been given carte blanche authority to prepare the requirements of the competition in a manner which will best serve the interests of architects and engineers and the aeronautics industry.

The required entries consist of two drawings rendered in black and white in any medium. The drawings will include four elements, consisting of a small scale plot plan showing the entire development of the ground area specified in the competition program; block plans of the structures needed to house the present and future facilities required in a complete airport; an airplane perspective of the principal airport structures showing their relation to the flying area and to the traffic arteries serving the port; and one elevation of the principal structures at larger scale. The competition program establishes the size of the ground area to be developed in the competition and specifies the type of accommodations deemed essential for the practical modern airport handling airplane rather than lighter-than-air traffic.

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of the Program Committee and a group of other members selected by the Chairmen, will judge the competition entries on the basis of their excellency of design, their practicability from both an engineering and aeronautical viewpoint, and the ingenuity displayed in developing both the structures and their relationship to the landing area to meet the air traffic of today and the immediate future.

The timeliness and public importance of this competition, and the fact that literally thousands of airports to be constructed in the next few years need competent architectural and engineering counsel, warrants the participation of every architect and engineer in the United States. Upon completion of the competition, the winning designs and those receiving honorable mentions will be widely published for the guidance of municipalities and organizations interested in airport development.

PROGRAM COMMITTEE

Harvey Wiley Corbett, F.A.I.A., F.R.I.B.A., *General Chairman*
Francis Keally, A.I.A., *Professional Adviser*

The Program Committee, which also serves as an advisory body during the period of the competition, includes the following men of outstanding prominence. The committee has been divided into four sections on Architecture, Engineering, Civics and City Planning, and Aeronautics.

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- Parker Morse Hooper, A.I.A., Editor, *Architectural Forum*
- Francis Keally, A.I.A., Professional Adviser

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- Harold Buttenheim, Editor, *American City*
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Aeronautics Section

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- Porter Adams, Chairman, Executive Committee and past President, National Aeronautics Association
- Major John Berry, Manager, Cleveland Municipal Airport
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- L. K. Bell, Secretary, Aeronautical Chamber of Commerce
- Colonel Paul A. Henderson, Vice-President, Transcontinental Air Transport, Inc., Vice-President, Pennsylvania Railroad, Curtiss Flying Service
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A REVIEW BY

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THE architectural drawings of Gerald K. Geerlings have already revealed him to the profession as an able and brilliant draftsman. His fame as an interpreter of architecture is so great that there will be no surprise in discovering the thoroughly craftsmanlike manner in which he has organized his volume on metal crafts in the arts. Mr. Geerlings has struck a happy medium in his method of recording architectural facts in text and illustration, and has avoided the disagreeable extreme of being "literary" or that of eliminating valuable textual information, a fault which may frequently be found with architectural books. In general character this volume partakes of the qualities of an exceedingly well edited professional journal. There are no waste spaces in the pages; the illustrations reveal intimately the special facts one would like to know about a door grille, or whatever the subject may be; and the whole volume is so well type-set and composed in such excellent taste, that it is a pleasure to pore through the book. The subject matter has been well selected, not only from the various historical phases in the development of metal crafts, but going extensively into the subject of metal work of today, which may be "modern" and different, but which most examples illustrate as refreshingly new and undeniably important in the development of crafts.

Any book reviewed or advertised in THE ARCHITECTURAL FORUM will be supplied to subscribers at the published price. A remittance at the advertised price must accompany each order. Books so ordered are not returnable.

For a slender and compact volume "Metal Crafts in Architecture" is documented and organized with thoroughness. The 20- to 30-page divisions of text which recur in sections of the work treat of everything that might have to do with the arts and crafts of metal work, from a scholarly *raison d'etre,* a sort of appreciation, through the interesting minutiæ of bronze production and the practical aspects. There are notes on the characteristics which affect the design of cast iron; modern methods for working copper and lead, and,—what will be most interesting to the architectural profession,—an absorbingly interesting discussion of various important processes such as that of depositing copper on glass; monel metal, and electroplating. In addition there is a brief chapter on specifications, and a valuable bibliography. Notwithstanding the general scholarliness of this *opus,* the author reveals himself as genuinely modest. He is thoroughly conscious of the extent of the province he enters, and he remarks of his book that it should be regarded as "a road map of arterial highways with the main milestone and signposts marked, rather than as a detailed contour map with every footpath plotted." But as has already been noted, Mr. Geerlings is much more than modest; he is a thorough-going craftsman, with a wholesome appreciation of the value of sheer craftsmanship in the arts. It is reassuring and pleasant to note that in preparing his material for the volume, while he obtained his historical information from the libraries, in the matter of craftsmanship and of practical considerations of the work of metals he went to the metal workers themselves. He remarks having interviewed many master craftsmen in and around New York. This, one feels, is the only sound way to produce a work of this sort.

We read in his *raison d'etre:* "In the pleasant meanderings of the author through the foundries and shops of the various craftsmen, he became increasingly impressed with the fact that unless the artisan takes personal pride in his work he is laboring in the wrong field. Unless there is a definite gain accruing from the joy of creating, then the metal game must be extremely disappointing; if one be intent on mere financial profits, it must be galling indeed to try to make them in decorative metalwork. How bitter to know the cost of each hammer blow or the expense of each moment spent in perfecting a mould! No different of course, and no more productive of art is the architect whose organization moves on a cost-sheet basis, and whose completed plans and details are determined not by arriving at a thoughtful and successful effect, but by a schedule of drafting costs which pre-arrange the date when certain work must be finished for blue-printing, regardless of æsthetic results." Mr. Geerlings is apparently an individual of real convictions, and in the thought so expressed he will doubtless find many in the architectural profession who sympathize with him. The volume is dedicated to that able architectural editor, Henry H. Saylor of *Architecture,* and doubtless to the publishers and to Mr. Saylor is also due much credit in the production of this really fine book. Note should be made of the care which has evidently been taken in choosing the illustrations with which Mr. Geerlings has enriched his volume on metal and metal working,—illustrations chosen with excellent taste to show work in the different historic styles of architecture and ornament.

METAL CRAFTS IN ARCHITECTURE. By Gerald K. Geerlings. Price $7.50. Charles Scribner's Sons, 599 Fifth Avenue, New York.

An Authoritative Work on

“THE GREEK REVIVAL”

By HOWARD MAJOR

THE search for effective types of architecture for domestic use led logically to the re-discovery of the style known as the “Greek Revival.” In the hands of a few particularly skillful architects it is being used with marked success, their use being based largely upon study of such examples as have survived the period, just prior to the Civil War, when use of the type was widespread throughout the United States. It is an entirely American style, founded not upon a following of current English architecture but upon a study by Americans of classic types adapted to domestic uses.

Mr. Major’s excellent work is the result of a careful study of the style as it was interpreted in the North and East, and particularly in the South. The illustrations of exteriors and interiors are full of suggestions for anyone seeking a variety of architecture bold, simple and effective, which supplies a fitting background for life in America. The book is richly illustrated, and shows existing work, large as well as small, in both city and country.

236 Pages; 7½ x 10¾ inches. Price $15

THE ARCHITECTURAL FORUM
521 FIFTH AVENUE NEW YORK

VENETIAN HOUSES AND DETAILS. By Samuel G. Wiener. 168 pp., 9 x 12 ins. Price $12. Architectural Book Publishing Company, New York.

IN this volume there has been faithfully recorded Venice for the architect; that is, the material has been selected with an eye for those qualities in structures which any architect will find significant and not merely picturesque or grandiose. The volume is an intensified compendium of such compactly arranged halftones and reproductions of drawings that scarcely a square inch of the fine coated paper of which it is made has been left unprinted. In other words, there is a wealth of material within its pages, and no space has been wasted on historical notations or casual explanatory details. The only text, in fact, is a brief two-page foreword. Only illustrations follow. Some naturally would have preferred to see the examples at least listed, dated where possible, and located. The present reviewer himself feels that the work would be more valuable to the student (in the broad sense) were it even slightly informative about the marvelous examples of Venetian houses which the author has chosen to illustrate. However, it is evident that the volume has been prepared primarily to meet only the requirements which architects make of their reference books,—that is, that they visually present available ideas, and in this the work most generously meets the requirements. Also it might be regretted that Mr. Wiener has restricted himself to secular architecture. To have included the churches of Venice would doubtless have been a large order, but the present reviewer somehow regrets that the author has not enriched his pages with at least a few of the minor examples of church architecture with which Venice is supplied in such variety and such abundance. After all, it is difficult to separate these types of buildings from among others of a definite period, and good design in architecture is good design, whether it be developed in the form of churches or of domestic buildings.

In his introduction Mr. Wiener surveys his subject briefly and with considerable understanding. He says in part: “This venerable republic on the lagoons was productive of a life and art that were distinctly different from those of the surrounding states. Of course the architecture was influenced by conditions resulting from its divers contacts, as well as by its peculiar situation. Naval wars in the East and wars with competitive Italian ports served to enrich its art with much that was foreign. From Byzantium the Venetians brought new ideas of plan and construction, and the influence of Oriental decoration is readily seen. Eastern artists were imported to work on their buildings. Columns, sculpture and all kinds of objects of art were loaded into their galleys to be brought home. The Byzantine style was expressed with a freedom not to be found elsewhere in Europe, and it is significant that the forms differed from those found at the source. The same is true of the architecture of other periods that reached Venice. The Gothic and Renaissance styles were also translated and developed into apparently careless compositions which seemed to mock the scholarly monuments of Florence and Rome and to compel a new classification. The contemporary style is discernible, but it is always faithful to the delightful qualities that are called Venetian. Here we find architectural irreverence combined with a superb artistic ability that cannot be paralleled

THE Ingredients of RESTFULNESS

LAST week, the writer of this article was shown a *restful* hospital room — the most pleasant hospital interior he had ever seen.

Great chefs concoct masterpieces with a few simple ingredients. The ingredients of restfulness were:

A tint of pale green on the ceiling. A warm, stippled green on the plaster walls. A cheerful two-tone green in the resilient floor of Jaspé Linoleum. Nothing more!

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Now suppose that we rip out this Jaspé Linoleum and substitute hard wood or cement. What happens? An alien element has intruded. The color harmony has been destroyed. Instead of the warm, comfortable "feel" of linoleum, we have a hard, unyielding surface. Instead of quiet—*noise!*

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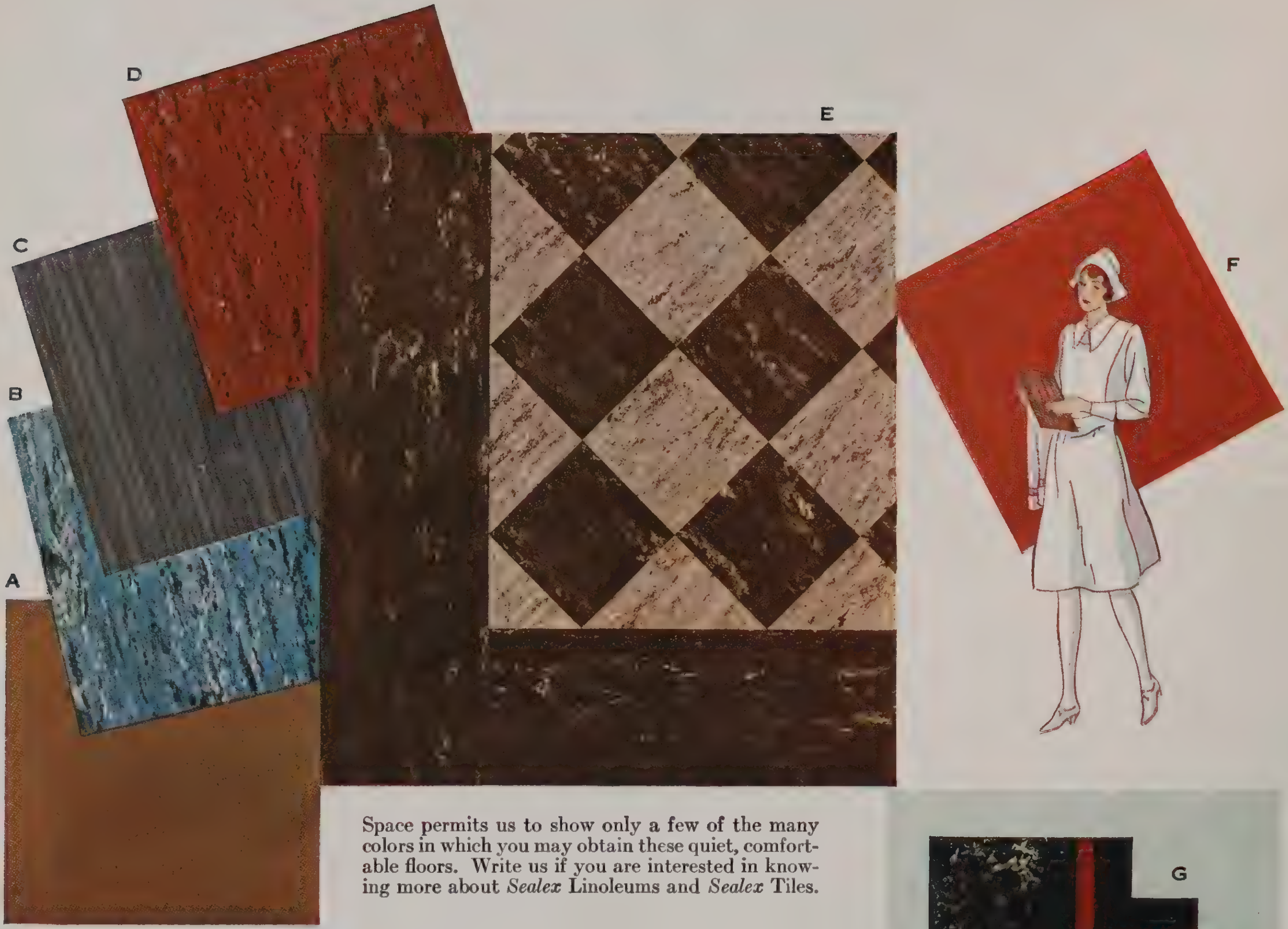
(Continued on next page)

Quiet and restful underfoot, as well as in their harmonious colorings, these resilient floors do their bit to shorten convalescence.



Space permits us to show only a few of the many colors in which you may obtain these quiet, comfortable floors. Write us if you are interested in knowing more about *Sealex* Linoleums and *Sealex* Tiles.

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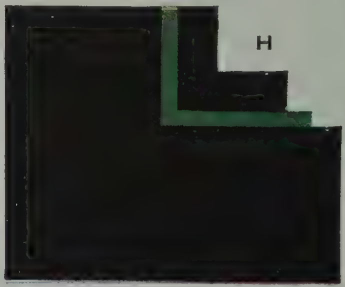

Black Border with Border strips of Green and Black

INGREDIENTS of RESTFULNESS

(Continued from preceding page)

floors. Cut them in strips and you have ornamental border effects like G and H. Cut them into tiles—of any shape and size—and you have a handsome, hand-made floor like E, suitable for your reception room or entrance hall. On request, the Bonded Floors designing staff will submit special patterns.

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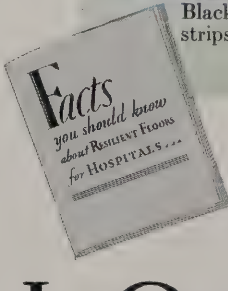
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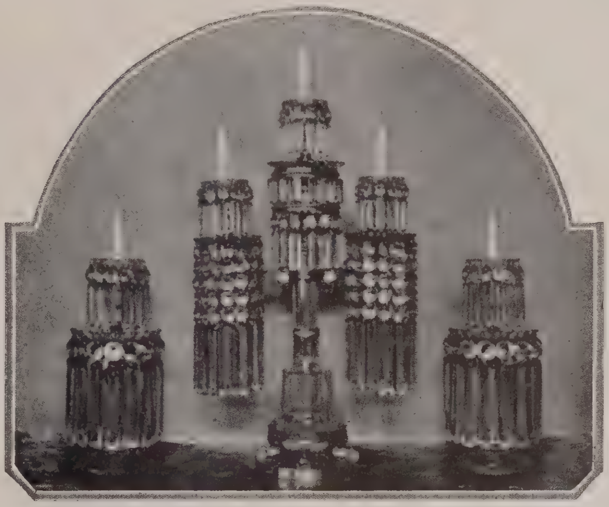
elsewhere. That kind of majesty that was Roman, and the perfection that the Renaissance in Florence left to us are not to be looked for in Venetia. For him who loves buildings created in a light hearted spirit, these canals and passages will offer endless enjoyment; here he will find facades of a festive loveliness that would delight an Oriental. If the joy of life can be expressed in compositions of marble and brick, he can find it here, for the Venetians knew no law but that the eyes of the beholder must be delighted." And here he might have added that conditions in our modern Florida duplicate, or in a sense parallel those of a wealthy, isolated and art-loving Venice. For that matter, several parts of America share these conditions. It is easier to understand,—and to forgive,—some of the buildings being done in California when one realizes more completely the economic conditions out of which they have sprung.

It would certainly have added to the value of this volume to have included more material on interiors, though again, there is a subject which has already been completely and very expensively exploited. There is only one interior shown from that marvelous jewel of the Venetian Gothic, Ca' d'Oro, and the one or two other scant illustrations here included leave one rather unsatisfied. But aside from this small matter of interiors, the material is widely and marvelously adaptable to our architecture in the United States. By that the reviewer means that many of the buildings shown are sympathetic in their styles, and in certain minor cases they might easily be confused with structures already existing in the United States, particularly so where a group of farm buildings and rustic cottages is shown, a few of which practically duplicate minor examples of the plantation architecture in Louisiana and other parts of the South, architecture full of character and interest.

Perhaps the greatest joy to be had from this volume will come to the casual lover of architecture and actual home builder, for the volume is full of those delightful bits of happy invention which may "make" a house. There are innumerable details,—chimneys, doorways, courtyards, and lanterns; a page or two of balusters, cartouches and other stone ornaments; gateways, exterior stairs, windows in a hundred and one patterns of the Venetian Gothic; intimate bits of actual brick surfaces, corner treatments, ceiling motifs; a few rare stone well heads, and a not inconsiderable number of splendid examples of wrought iron. In his drawn details of some of these features, particularly of the ironwork, Mr. Wiener shows himself a skillful draftsman. In general his drawings are technically good and very pleasing, but with little economy of line in his work.

In his brief introduction, Fiske Kimball remarks that, "the domestic architecture of Venice represents an unbroken tradition of seven or eight hundred years, to which every style from the Byzantine to the Baroque has made its contribution without interrupting continuity. The palaces of the Canal, the villas of the terra firma, even the simple farm houses are full of suggestion not only in composition, but in the sympathetic handling of materials. The great historic publications on Venice are likely to be inaccessible to the average designer, and he will welcome the assemblage of illustrations which Mr. Wiener has brought together,"—in which opinion one will heartily concur with Mr. Kimball. The volume is full of matter which is valuable.

Period Lighting Fixtures



By far the most complete and authoritative work on this important subject, it is a study of lighting fitments of all the historic styles of architecture and decoration. Carefully written by Mr. and Mrs. G. Glen Gould and lavishly illustrated, the volume is a dependable guide in the designing of fixtures for the most severely simple or the most elaborate interior.

274 pp., 6 x 9 ins.
Price $3.50

THE ARCHITECTURAL FORUM
521 Fifth Avenue New York

SHOP FRONTS
English, American and Continental Examples
Edited by
FREDERICK CHATTERTON

A study of the modern shop front, drawing for inspiration on the fine old fronts which still exist in England, France, and other countries of Europe. The volume includes in many instances plans and details. This is a work of practical value to architects called upon to plan and design the facades to small buildings, making them practical as well as architecturally attractive.

104 pp., 9¾x12 ins. Price $7.50

THE ARCHITECTURAL FORUM
521 Fifth Avenue New York

THE ARCHITECTURE OF THE RENAISSANCE IN FRANCE. By W. H. Ward. 2 Volumes. Price $15. Charles Scribner's Sons, New York.

IT is interesting to realize that of the mass of literature dealing with the architecture of the French Renaissance, no work dealing exclusively with the subject existed, even in French, until 1900 when Mr. Ward published his first edition of this work. In 1921 Sir Reginald Blomfield published a similar work, under the same title, in four volumes. In a remarkably short time the editions of both these works, because of their intrinsic value and merit, were exhausted. This left the student of architecture in an unfortunate position. Either one or the other was indispensable for a working knowledge of this most important development of architecture, and yet where either was to be had at all, the cost placed it beyond the reach of most. The high prices these works brought but a few years after their publication indicate conclusively the esteem in which they were held. Fortunately, Mr. Batsford of London and the Scribners of New York have solved this problem by reprinting Mr. Ward's two volumes at a price within the reach of all, and they form a work with which every architect and student should be familiar.

This second edition is edited by John W. Simpson, who makes it clear that in its present form it is Mr. Ward's own work, that he had himself revised it before he died, and that Mr. Simpson merely rewrote some few pages "such as those dealing with the seventeenth century history of the Louvre," which incorporated information newly available. Mr. Ward has a mind peculiarly fitted for archæological research in a period of complex development and gradual decline of an architectural style extending over an era of three and a half centuries. His writing indicates a breadth of view and a scholarly method of exposition which make his work invaluable to students of French architecture,—and French architecture of the seventeenth and eighteenth centuries is a living art of today, in which there may be drawn a strong parallelism with ours of the present,—an architecture helpful in solving many of our contemporary problems.

The author has followed a well defined method of classification throughout each chapter, from which he does not deviate. The method is simple and to the point and makes the work of great value for quick reference. In each period he gives a remarkably concise historical sketch and yet embodies the salient points affecting architectural development. There follows the outlining of the characteristics of the period, in which Mr. Ward's archæological mind is at its best. Each characteristic is defined in a concise manner, and nothing is omitted. Again the characteristics are subdivided into those of architecture and those of decoration, further facilitating reference. In each period he traces the development of the style through the medium of palatial and domestic architecture and thereby compels interest because of the reader's understanding of such buildings;—with this knowledge the reader more readily follows his subsequent development of public buildings and churches. Again, he gives short reviews of the lives and work of many of the great architects of the French Renaissance and a bibliography of important works upon architecture.

The Smaller Houses *and* Gardens *of* Versailles

By Leigh French, Jr. and Harold D. Eberlein

FOR the moderate-sized American suburban or country house there is nothing to follow in the way of a type at once more beautiful and more practical than the seventeenth and eighteenth century French houses of the same kind. The type possesses that graceful balance in the way of exterior design and that slight degree of formality of interior which is being expressed in current domestic work of the same character, and from all the domestic buildings of seventeenth and eighteenth century France there is nothing which offers a more fruitful basis for study than the smaller villas built near Versailles for the attendants of the French court. These buildings possess in an unusual degree just those qualities in the matter of design now most sought for in America.

202 Pages, 9¾ x 11¾ Inches. Price $6.

THIS volume, prepared by two students of French and American architecture, is a practical study into the adaptation of the simpler French forms to American conditions. There is not one of the many villas illustrated which does not afford abundant suggestion in the way of exteriors to present-day architects, and the interiors with their simple and graceful disposition of wall paneling, mantels, and stairways abound with suggestions for working out interiors to accord with the expression given by the buildings' exteriors. Plans in many instances are easily adapted for use today, and the arrangements of the gardens and other outdoor areas offer suggestions for making these important adjuncts to American suburban or country houses heighten the character and interest of the buildings themselves.

THE ARCHITECTURAL FORUM, 521 FIFTH AVENUE, NEW YORK

Administration Building (above). One of the many buildings of the Philadelphia General Hospital equipped with *Columbia* Window Shades and Rollers. *Architect:* Philip H. Johnson; *General Contractor:* Kober Construction Co.

Pennsylvania R. R. Office Building. (Shown directly below). *Architect:* Penn. R. R. Architect; *General Contractors:* Irwin & Leighton.

Chancellor Hall (below). Philadelphia's new giant apartment. *Architect:* Arthur W. Hall; *Contractor:* F. V. Warren Co.

Seminary of St. Charles Borromeo (below). *Arch.:* Hoffman-Henon Co., *Contractor:* McCloskey Co. Photo © Aero Service Corp.

Philadelphia Public Ledger (at the left) *Architect:* Horace Trumbauer; *General Contractor:* Doyle & Company.

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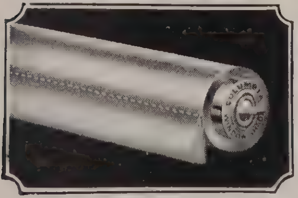

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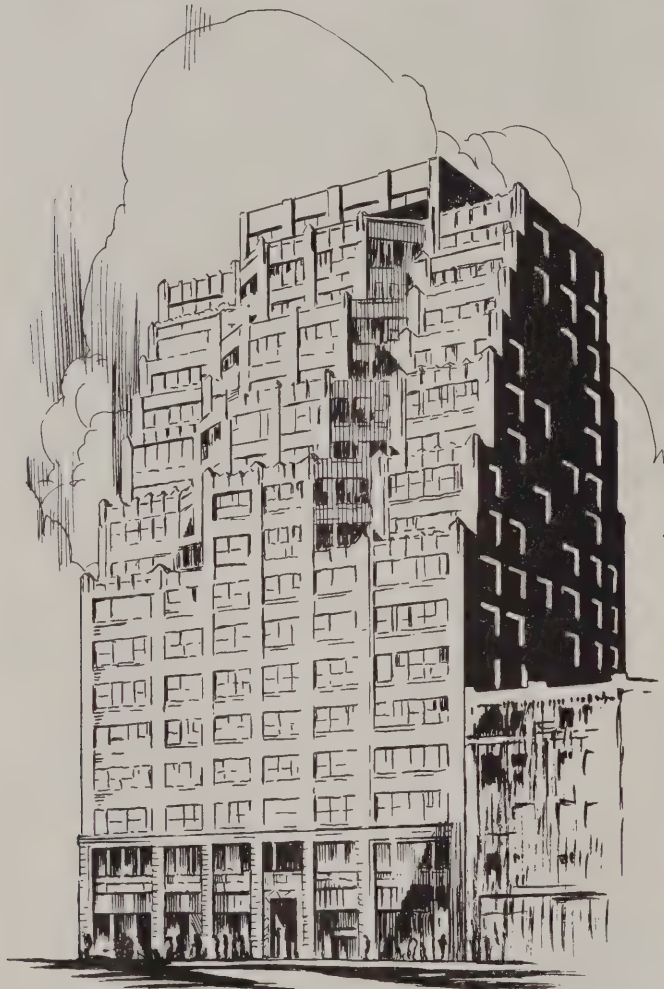

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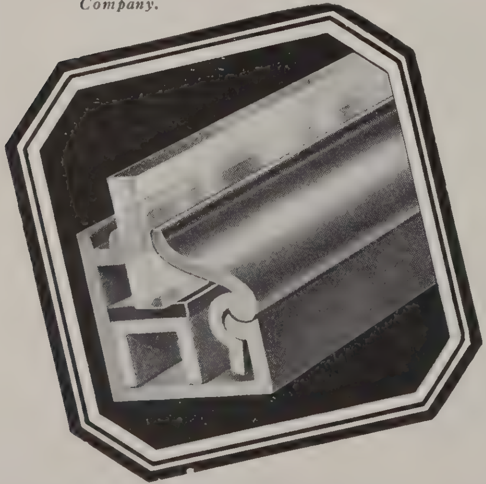

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THE EDITOR'S FORUM

COMPETITION FOR AIRPORT DESIGN

PRELIMINARY announcement was recently made of a national airports designing competition, the purpose of which is to direct public attention to the need for permanent airport facilities and to concentrate for the first time the technical ability of the country upon this important phase of aviation development. The contest is sponsored by the Lehigh Portland Cement Company, which has underwritten its expenses and has offered $10,000 in prize money. It will be known as the "Lehigh Airports Competition." Additional awards may be made, and negotiations are under way with several cities contemplating the construction of airports to the end that these cities will formally recognize the winners and engage them to design their airports. The competition will thus have a practical, rather than an academic, hypothetical or merely discussional value. It is hoped that out of it will develop designs of the utmost practical and inspirational importance to hundreds of forward-looking American cities and to air transport companies in the planning of flying fields.

Harvey Wiley Corbett has been appointed chairman of the program committee, which will draw up the specifications for the competition, and he will also serve as foreman of the jury of awards. Among other members of the committee who were present at the luncheon at which the announcement was made, were Raymond M. Hood, known for his work on the Chicago *Tribune* Tower; Professor William A. Boring, Dean of Architecture at Columbia University; Francis Keally, who recently completed an architectural study of European airports; Parker Morse Hooper, Editor of THE ARCHITECTURAL FORUM, and C. Stanley Taylor, general manager of the competition. The architectural section of the program committee will be responsible for the development of the competition requirements pertaining to the design aspects of airports, and other sections of the program committee are being organized to represent the engineering profession, the aviation industry and the interests of municipalities and city planners. While the personnel of these other groups has not been finally settled, it is known that George B. Ford, city planner and designer of airports, will head the civics section, and that Senator Hiram Bingham, President of the National Aëronautical Association, has appointed Porter Adams, Executive Secretary and past president, to represent that organization on the Aëronautical Section. Major John Berry, Manager of the Cleveland Municipal Airport; Louis K. Bell, Secretary of the Aëronautical Chamber of Commerce, and Harry Schwartschild, Editor of *Airports,* are also members of this group, which will be further enlarged by adding others.

"Commercial and civic aëronautics must depend for their further development upon the extension and improvement of airports. It is hoped that this contest will develop national interest in the erection of suitable transportation terminals and permanent buildings and appurtenances to flying fields in order to place American civil aëronautics on a plane with, or even above, that of European practice. In Europe the air transport companies have made their greatest success in passenger carrying, while in America commercial aviation has made its greatest strides in handling mail and express. This is partly due to the fact that American airport development has not made adequate provision for the comfort and convenience of passengers using existing airways. But aviation pioneers now are blazing trails more easily through profiting by the experience of the railroads."

Mr. Corbett, who heads the program committee is quoted as saying: "Within the next five or ten years every city of importance and many towns of secondary importance will require landing fields just as they have in the past required railroad stations. A landing field, because of its importance in area and because of the city traffic it will necessarily draw, will become a feature in the major interests of the community. As such, it needs careful study and should be developed along lines permitting rational expansion. We have glaring examples in every city in the United States where the transportation problems, both by rail and water, have been met in a helter-skelter, unthinking fashion, with the result that those very portions of the cities in question which should normally provide the finest outlooks and settings are destroyed by exposed railways, factories, docks of an unsightly appearance and an uneconomical arrangement. Millions are being spent today in an effort to put order into the chaotic condition which has grown up through this neglectful method of handling our transport problem. An aviation center should provide in addition to the field itself, which of course must be planned to meet all the practical conditions of flying not only as it has been developed to date but as it may develop in the future, hangars, repair shops, housing facilities for flyers, mechanics and repair men, factory equipment, administrative headquarters,—all dealing with the operation of the flying machine.

"Such a plan can be developed for any city or town in the United States. It can be developed so that each unit, however small, can be built as needed and ultimately become an important element in a comprehensive layout. Order is the first and most important factor in architectural beauty. Harmony is the second. These two are vital in the development of art in aviation fields, but neither will be there unless the whole project is conceived in advance and evolved on the basis of a comprehensive plan."

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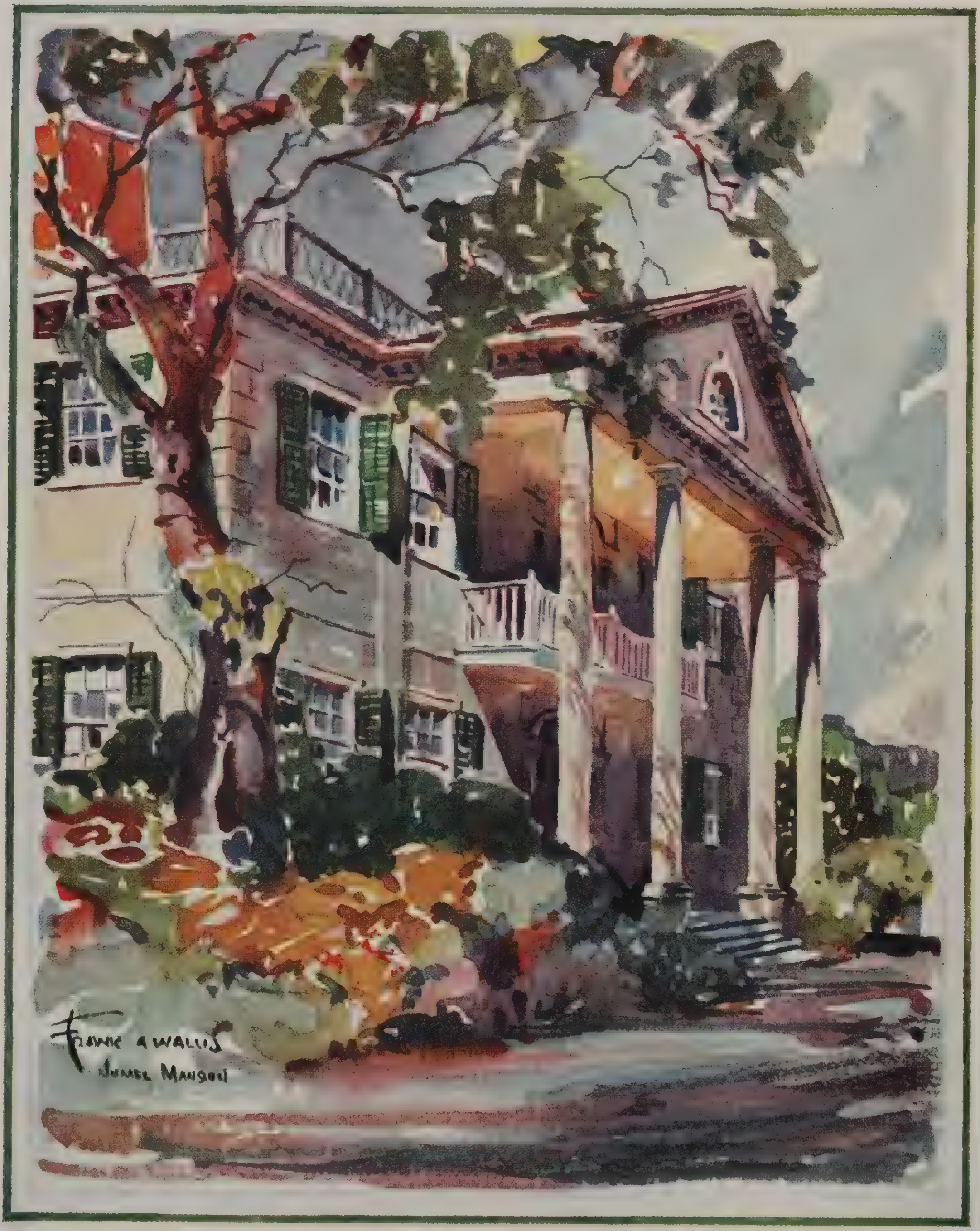


JUMEL MANSION, NEW YORK

From a Water Color Drawing by Frank A. Wallis

THE
ARCHITECTURAL
FORUM

VOLUME L NUMBER FOUR

APRIL 1929

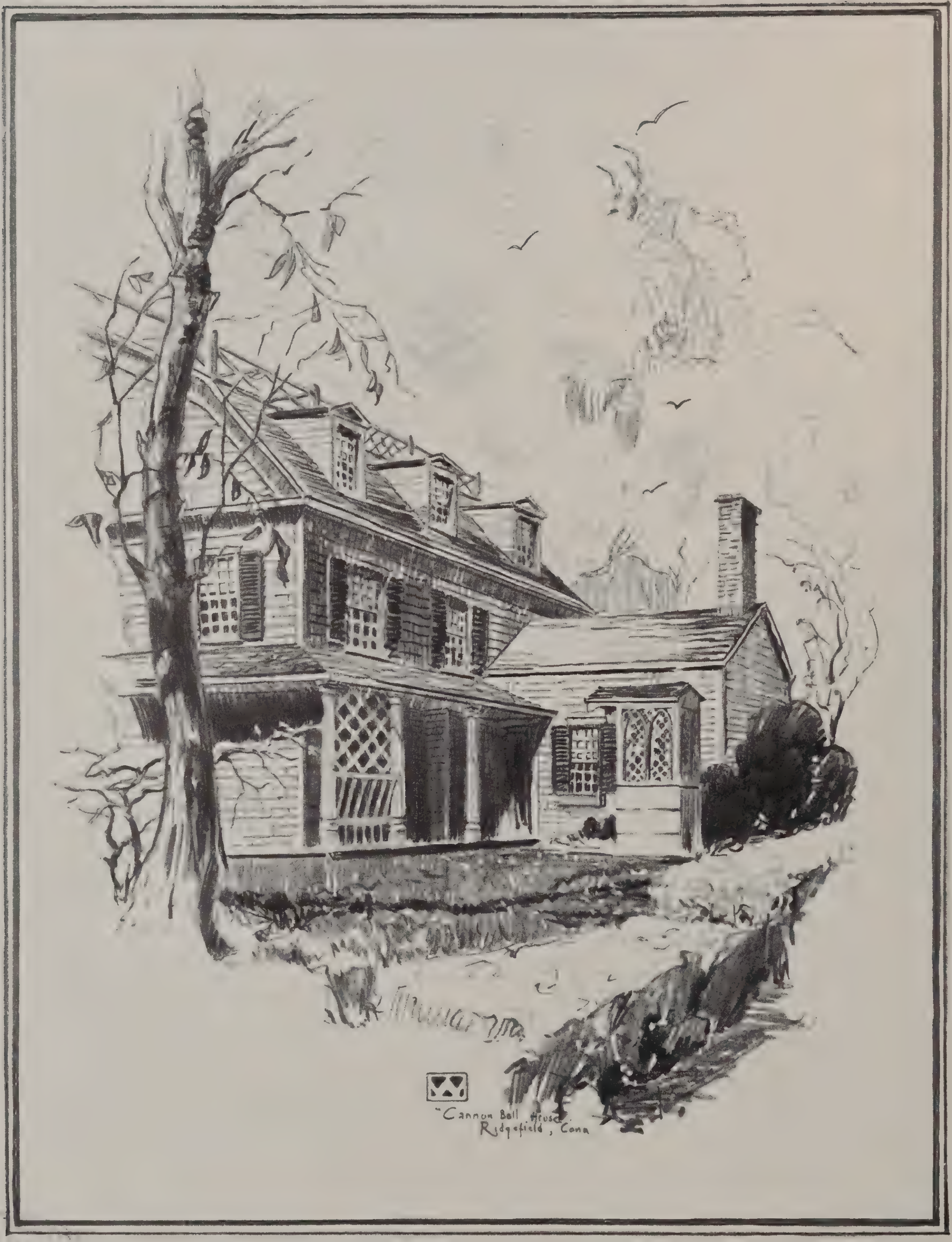
NEW AMSTERDAM AND ITS HINTERLAND

TEXT AND DRAWINGS BY

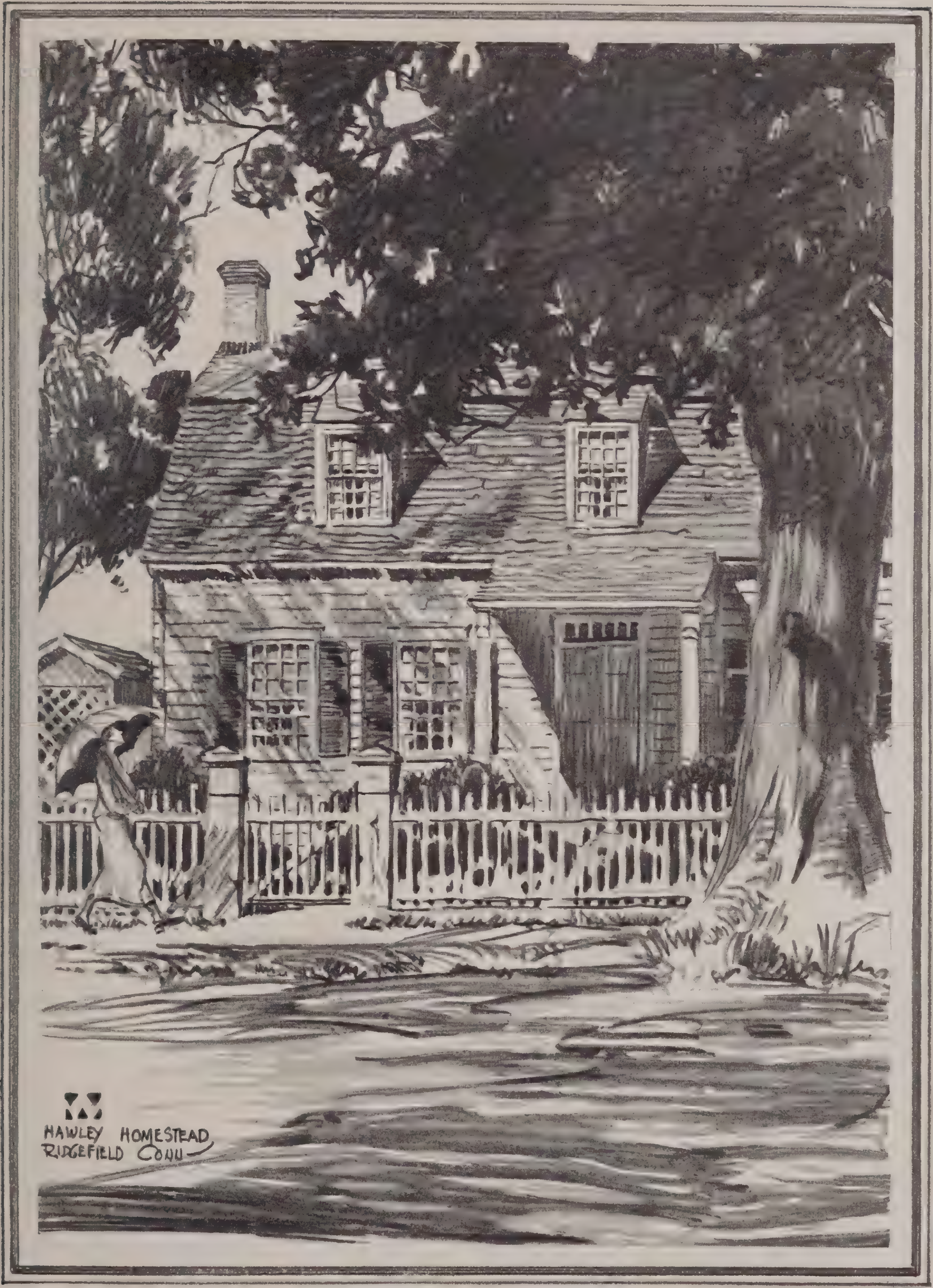
FRANK A. WALLIS

THOSE sturdy people who ventured across the sea to America, that they might settle and live in accordance with their most cherished ideals, quite unwaveringly subscribed to Cicero the ancient when he expressed the thought that, "the chief thing in an art is that what you do shall be befitting." They desired to manifest more of the thing which they recognized as the art of living, and this just as they saw it. Fleeing from the religious intolerance of their motherland, and intent on establishing a more hopeful future in America, the land of freedom and promise, the first company of Dutch settlers arrived on the ship "New Netherland" in 1623. According to Jackson, there were nearly 30 families on this voyage, the majority being Walloons; some landed at New Amsterdam while the remainder sailed farther south to the region of Delaware. Upon the arrival in New Amsterdam of these wayfarers, their thoughts were immediately diverted from unpleasant voyaging to the erection of suitable homes. Conditions as they found them were very difficult, to say the least. There were a great many hardships to be endured. These pioneers had to live and build, and to that end they worked unceasingly, doing the best that circumstances would permit. From the very inception of this settlement, which was destined to become the great metropolis of New York, when a bartering post and protective stockade had been built on the southern end of the island, and directly on through the entire colonization period until after the War of 1812, our ancestors seem to have possessed an extraordinarily keen understanding of appropriate home building. Obviously enough, the log cabin was the first form of building. Regular-sized timbers, siding and even shingles later made their appearance with the advent of the sawmill, but in the scramble for shelter there was but little time for æsthetic consideration. Whole villages of these cabins were put up within the limits of stout stockades, for the Indians were not always friendly with the whites who came to settle on their shores. Albeit the natives received something for their lands, there were shortcomings here and there. Large tracts of virgin forests had to be cut and the land cultivated. Spinning wheels and looms were brought out to manufacture clothing. As families grew larger and the population increased, there appeared small houses of worship. Step by step, living conditions grew more improved and comfortable; better and more durable homesteads were built, but always with simplicity as the watchword. Building materials as well as facilities were more unlimited and less static. Homes with more beauty and charm came into being, but always built with practical adaptability to serve their particular requirements. In short, these settlers were a valorous and industrious people with honest activities carrying them constantly forward. Thus, with such endeavor and sense of the fitness of things, the resultant blessing was well earned prosperity. Of such was moulded the character of the early colonists, and out of all this there was to grow our eighteenth century architecture, with all its great influence.

Today, after the march of years has mellowed the pristine charm of such of these delightful old homesteads as still exist, they seem ever to be increasing in value as splendid inspiration for the modern country house architect. Availing oneself of their lure, some of these attractive old houses might suggest a fascinating pilgrimage, starting in New York, where a number of fine old examples that have escaped the hand of "progress" are still struggling to live in the shadows of some none too beautiful skyscrapers. Journeying northward on the old Boston Post Road as far as



"OLD CANNON BALL HOUSE," RIDGEFIELD, CONN.



HAWLEY HOMESTEAD, RIDGEFIELD, CONN.

the quaint little village of Bedford, and thence a little farther on, one comes to Ridgefield, the immaculate, located just across the state line in the borderland of Connecticut. This pleasant pilgrimage, covering but one or two of the many important colonization points along the seaboard and its various hinterlands, would lead away from the hubbub of a tumultuous city to more unbeaten paths where there still exists some of the flavor of America's old time life and rural architecture and to a storied countryside that will ever be interesting and colorful. Any attempt here to dwell at great length either on any particular homestead or the houses generally would be hardly possible; however, let this suffice to reflect but a bit of the incomparable pleasure of settling oneself down into the atmosphere of some excellent types of century-old houses,—a few of those still standing.

While there are certain similarities in the general character of the various influences in eighteenth and early nineteenth century work on Manhattan Island and the immediate vicinity, there are distinct variations that tend to make comparison both interesting and worth while. One of the most important homesteads built before the Revolution in New York, and one that is perhaps more colorful than others in its storied and historic past, is the Roger Morris house on Harlem Heights. From the day in 1765 when the original house was about completed, up to the early part of the nineteenth century when Stephen Jumel came into possession of it, this farmhouse had been the scene of a heterogeneous train of events, two of which were its occupation by General Washington and likewise by the British forces. After taking over the building in 1810, Jumel, who, by the way, was a wealthy French merchant, set diligently about the task of restoration. Only after punctilious effort and tremendous expenditures,—for neglect had left ugly scars,—was the place once more in order. The house now stands, fairly well preserved, as one of New York's most interesting historic monuments. This beautiful building, with its elegant portico and general refinement of detail, has served well to attract the present-day designer. In the past there has been rather lengthy discussion as to whether the two-story portico was part of the original conception or something added in later years. An exceptionally beautiful doorway on the front and a finely proportioned door on the west elevation are of special interest. An attractive feature of the plan is the wide hall, forming an axis from front to rear of the house, with large high-ceiled and well lighted rooms on each side. A delicate and restrained doorway, leading from the pantry to the east side of the house, is not a part of the first composition but came when the place was restored. Then, too, there are fine arrangement and combination of wood quoining and flush-jointed boarding, all of which help to make the old house the more unusual and interesting architecturally.

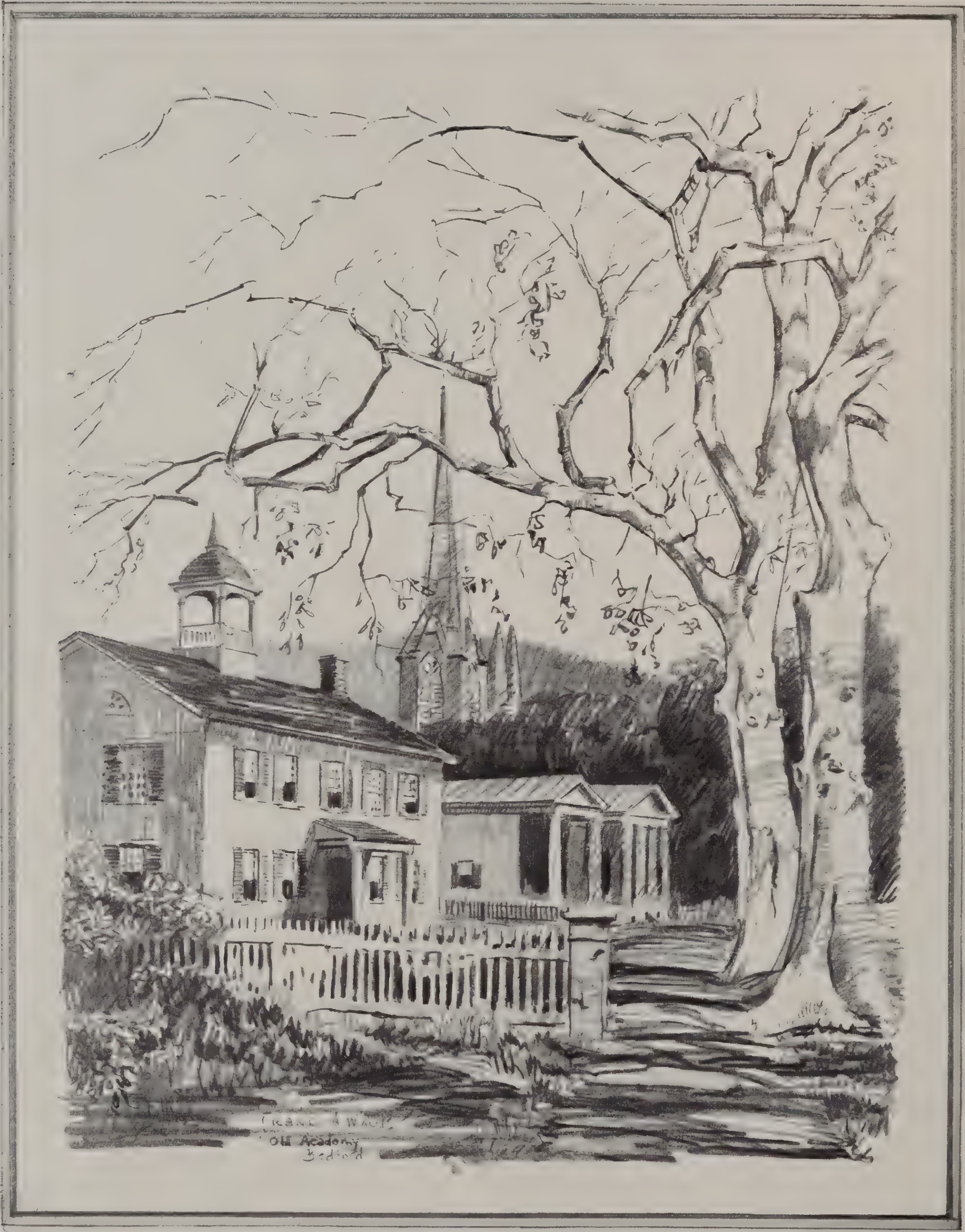
The Dyckman house, at Broadway and 204th Street, is another homestead that eloquently bespeaks the simplicity characteristic of our early Dutch builders. Though this house was not built until after the Revolution,—in 1783 to be more exact,—it bears much of the character of, and might easily be mistaken for, one of more ancient years. The wing is of earlier date than the main mass, and it is quite possible that it somewhat resembles a similar part of the original Dyckman house that was built about 1667 and destroyed in the struggle that followed over a century later. In the homestead, as we find it today, simplicity is everywhere apparent, even to the combinations of the various materials and textures. Recently the house has been carefully restored by members of the Dyckman family who, by the way, were still the owners, and it is through their kindness that the interiors, furnished correctly, or much as they were in the early days of the house, are opened to an appreciative visiting public.

Alexander Hamilton's "Grange," it is recorded, was built in 1801, when, after experiencing a political reverse, the beloved statesman decided to become a gentleman farmer. Unfortunately, however, his plans were abruptly terminated by the tragic episode which followed his duel with Aaron Burr. Hamilton was a keen, discriminating individual, and needless to say his very superior taste was reflected in the home where he meant to spend his remaining years. The Van Cortlandt house, and likewise the Gracie mansion are two other homes of long-ago New York, which have a distinctive air about them. The later place, with a commanding view, is situated in Carl Schurz Park on the East River. On seeing this place today one appreciates its lordly position, from whence the original owner could see for miles up and down not only the East River and far out on Long Island, but the mighty Hudson as well. The house is of the square type with excellent taste shown in its imposing proportions and simple details. The north side is graced by the presence of a splendid late Colonial doorway. The Van Cortlandt house in the park bearing the same name was built by Frederick Van Cortlandt about 1750. There is a feeling of dignity to the general mass of this building, and the arrangement of the windows as well as the designing of the lesser details is well considered and happy. Both on the exterior and within, there is felt the extremely definite influence of the early Georgian era. The tiny "Poe cottage" on Kingsbridge Road, implanted among some taller and more or less ungainly neighbors, is of more recent date, perhaps, but none the less delightful. No more adequate description could be made, perchance, than to quote,—"so neat, so poor, so unfurnished and yet so charming a dwelling I never saw." There are some, but not many, other homesteads of early Manhattan that have managed to escape the monster called "property value," which is apparently, completely devoid of any architectural reverence or appreciation.

Following the road that leads up to and beyond the east side of Kensico Dam, once again we experience the spell of Westchester's bewitching beauty. A few miles farther on and just before entering Bedford, there is certain enchantment in the fresh looking countryside with its verdant hills rolling away to the grayish pinks on the horizon. This country has a resemblance to Normandy and to many parts of England, and we can readily feel the simplicity of it that was so attractive to our ancestors. Bedford, the tranquil, near yet far away from the haste and bustle of a large metropolis! What a pleasant relief and contrast for city-weary eyes! It is named after the town in Bedfordshire, England, from whence came its early settlers. Etymologically, the name comes down from the Saxon as "Bedanpond,"—"more eminent," Camden explains, "for the pleasantness of its situation and its antiquity, than for either beauty or largeness." The village is charmingly situated a little north of the Old Mehanas River, the picturesque banks of which were the favorite stamping grounds for several tribes of Indians, presided over by Catoonah, the sachem. It was along these fertile shores that, in the earliest days, a vast growth of hops was found, which apparently figured, in name at least, in the sale of this and adjacent acreage. Ancient records prove that the "hop ground" purchase consisted of a grant of 7,700 acres of this desirable locality, which Catoonah gave to the settlers in exchange for, according to the bill of sale, "twelve indian coats, six blankets, 300 gilders wampan, two yard red cloth, six yard red coton and more by expenses," the total value of which ran in the neighborhood of some £46. To be sure, a good bargain! Catoonah and his several business associates, "doe bargen and hereby grant," the deed read on, "full liberty of timber and herbedge for them and theire creatures upon our aincent lands for euer and doe hereby acknowledge to have received satisfaction for the land above." Commissure Robert Law affixed his hand to this grant under the date of December 23, 1680, and it is assumed that the settlement was well under way by this time, though it was not until a year or two later that Bedford officially received its name through a general court order, thus establishing the settlement and giving it a permanent and legal status.

Not unlike many other colonies in the war area, Bedford was, for no good reason, destroyed by fire on July 2, 1779, when a band of British soldiers under Colonel Banastre Tarleton was making its way to Fairfield, Conn. Consequently, those houses that were immediately rebuilt are dated from this period. One's first impression of this fair town, with its aged elms arching the roadways, is of the quiet and irresistible beauty of many of its century-old homesteads. They have a manner full of silent grandeur and dignity, but in no wise are they pretentious. This may be attributed to the detail, that is always refined and convincing. On either hand of the village green, we find house after house of that fine order, peacefully standing in the cool shadows of mighty elms or sycamores, whose thick foliage often permits tracery of sunlight to describe delicate designs on their snow-white facades. Two or three tiny but finely balanced temples bear marks of the classic revival, but for the most part the houses are more domesticated buildings. The old "Academy," now used as a library, has a very flat gable roof. Its well placed fenestration and excellent doorway lend a compelling atmosphere to this house. The court house, dating back to 1787, is a gambrel roof affair, which like the Academy, is pleasingly surmounted by a fine belfry. Windows have been replaced here and there by the common or garden variety, but most of the original 12-light sash are still in evidence. On the green there may be found a perfectly enchanting little building that is known as the "Bedford Museum." The walls of this minute place are built entirely of stone that runs all the way up the low gable to the soffit of the overhang. This stonework, delicately pointed and superb in color, is one of the finest examples of stone masonry to be found anywhere. Around Bedford there are many other old farmhouses, and their appurtenances, such as delightful little smokehouses, woodsheds and the like, command our admiration today, and one feels instinctively that as long as they continue to exist, they will suggest a befitting and unstilted art of another day,—a manner entirely devoid of affectation.

The earliest known inhabitants of Ridgefield were the Ramapo Indians who also came under the authority of Catoonah, the high chief. To them, this vast section of unbroken country that was to become Ridgefield, was called "Caudatowa," meaning "highland." This was significant in itself, but more appropriate was the name "Ridgefield," because of the several ridges running through the town from whence one might have a lordly view of the surrounding country. The town began settling in the last years of the seventeenth century, though it was not until Sep-



THE OLD ACADEMY, BEDFORD, N. Y.

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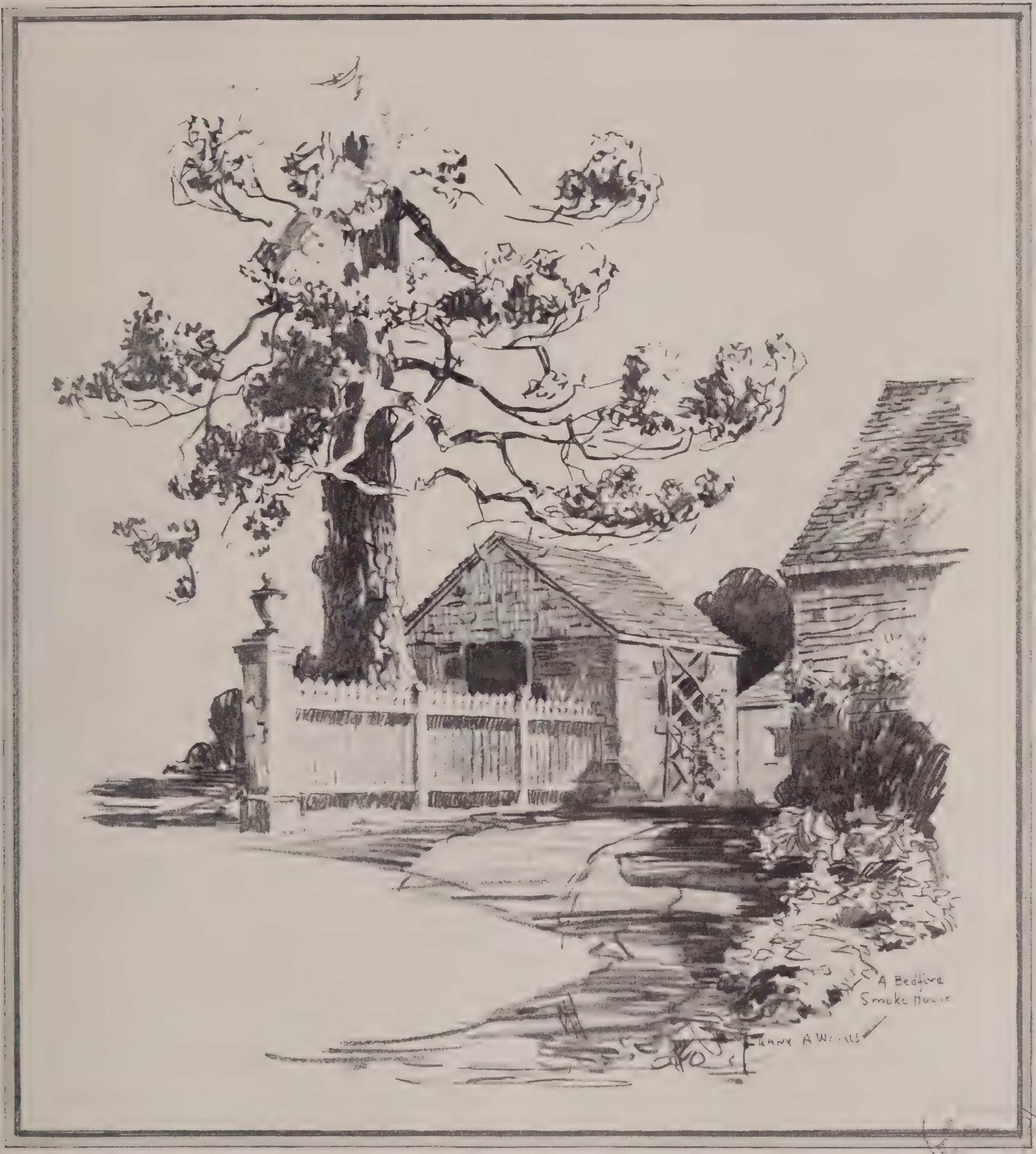


A SMOKEHOUSE, BEDFORD, N. Y.

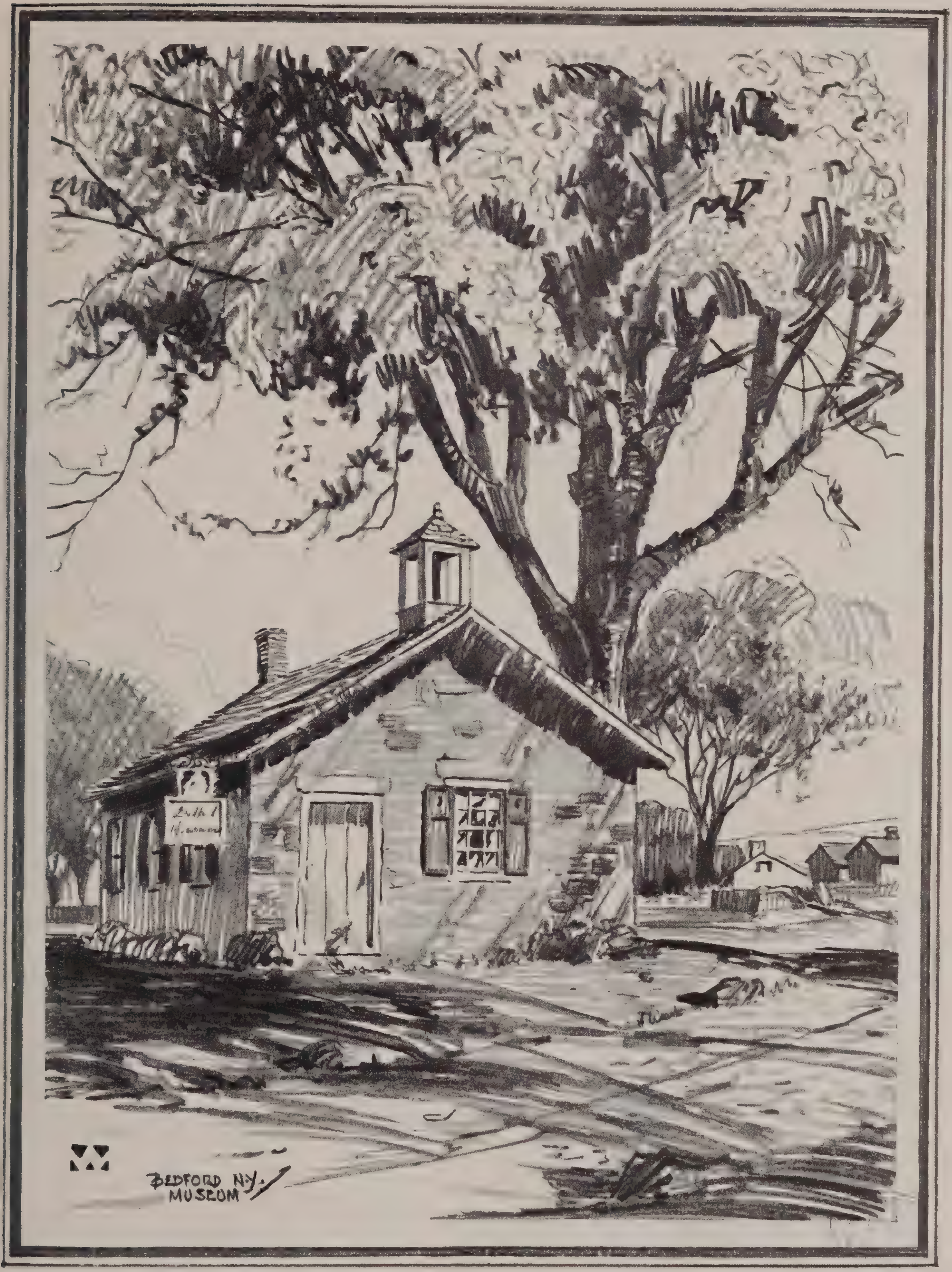
LIBRARY

tember of 1708 that the town deed was given to seal the agreement between Catoonah and the white settlers. He disposed of some 20,000 acres in consideration for approximately £100. It was cash now,—obviously Catoonah was doing a land office business, but everybody concerned seemed quite satisfied with the transaction,—even Queen Anne, who some six years later issued her official indorsement of the patent. The early towns people of Ridgefield were a thrifty, unassuming lot, and each member of the colony was quite ready to lend a helping hand to his neighbor. There was no trace of grandiloquence here, no bombastic qualities either in their living or their architecture, but they harmoniously worked in all things to promote the growth of the town; to them it was their work, their play and their "art . . . in which the hand, the head and the heart go together." In the stirring spring days of 1777, Ridgefield was the scene of a fierce clash between some 600 Americans and the malignant Tryon, the last royal governor of New York, and lately commissioned colonel in His Majesty's army. But in due course the war ended, and the village once more settled back into its more becoming attitude of peace and progress. That the town kept expanding is evidenced in the voted ruling that "Horses, neat cattle, mules, swine and geese shall be prohibited from running at large on the Highways or Commons of this town."

It is with keen pleasure that one visits Ridgefield today. Everywhere in the town and in one form or other, there may be seen the carved pineapple, which throughout the eighteenth century, was known as the symbol of hospitality. Here one feels an unmistakable crispness and cleanliness,—a flavor of fine character permeating the entire town. The old Keeler Tavern (1787), at present owned by Cass Gilbert, is one of the most attractive buildings in Ridgefield. The main part of the house has a gambrel roof of very graceful slopes, surmounted by a delicate railing. The small gabled wing is unusually well designed and falls into the composition especially well, forming one of the house's distinctive features. The place possesses further architectural distinction, marked by uncommon yet simple details such as porch columns, seats, well-head, etc., all of which lend individual charm. Often since the Revolutionary days, this erstwhile tavern has been called the "Old Cannon Ball House," for the reason that embedded in one of its heavy timbers, is a shot which undoubtedly had a more violent purpose. The ball has been left there as a lasting memorial to its more strenuous days. This tavern was a gathering place for Ridgefield's parties and other social functions, and it likewise was a favorite stopping place on the old New York to Boston stage coach line, where travelers and horses could be refreshed and put up for the night. There still stand a number of interesting examples of the early work; among the best is the neat little cottage built by Rev. Thomas Hawley in 1713. Since its date goes back that far, it is easily the most ancient building in the town. This house has the cornice line just high enough to make the width of the facade quite convincing. The gambrel roof has three closely cropped dormers, each containing the period's 12-light sash. The dormers may have been built in later years, however; be that true or otherwise, they add a large share of charm to the entire design. There are extremely fine proportions in the windows on the first floor, and the green shutters with their very narrow side stiles are particularly delightful. The little entrance porch strikes a jolly note that could not be overlooked. Today this house is well preserved and cordially invites architectural investigation. There are other old homesteads in Ridgefield that come in for a generous share of interest and attraction, though in some cases one regrets the evidence of suffering due to later "finery" such as indifferent types of doorways, porches, bay windows, etc.,—evidences of architectural hysteria which everlastingly come under the head of "modern improvement." These houses may be added to with a reasonable amount of good taste, but it is decidedly unfortunate where mistakes have been made, mistakes which often ruin them.

Perhaps there will be, sometime in the future, newer modes and impulses to influence our domestic architecture; there may come fresher conceptions in styles that are far different from anything we have ever had, but for the time being the modern American architect has but little precedent of more vital importance than the variety of suggestion and inspiration handed down by our builders of other years. These fine old exemplars have survived the test of many decades, and some will continue to live for years to come. One cannot help but admit that Sir Christopher Wren caught hold of one of the underlying realities of building when he said "Architecture aims at Eternity."

Editor's Note. Seeing Bedford and enjoying its charm and beauty, one wonders how long either beauty or charm may endure. Mention has already been made of the Dyckman homestead, surrounded now by cheap and ugly apartment structures, and to the Gracie mansion, which seems destined to be hemmed in by buildings of a better order but still hardly calculated to enhance the charm of the old homestead, while the Van Cortlandt house is even now protected only by its broad acres which form a public park. May the Fates be kind to Bedford and Ridgefield, and long may they last to inspire architects and home builders and to lead in advancing good taste.



THE MUSEUM, BEDFORD, N. Y.

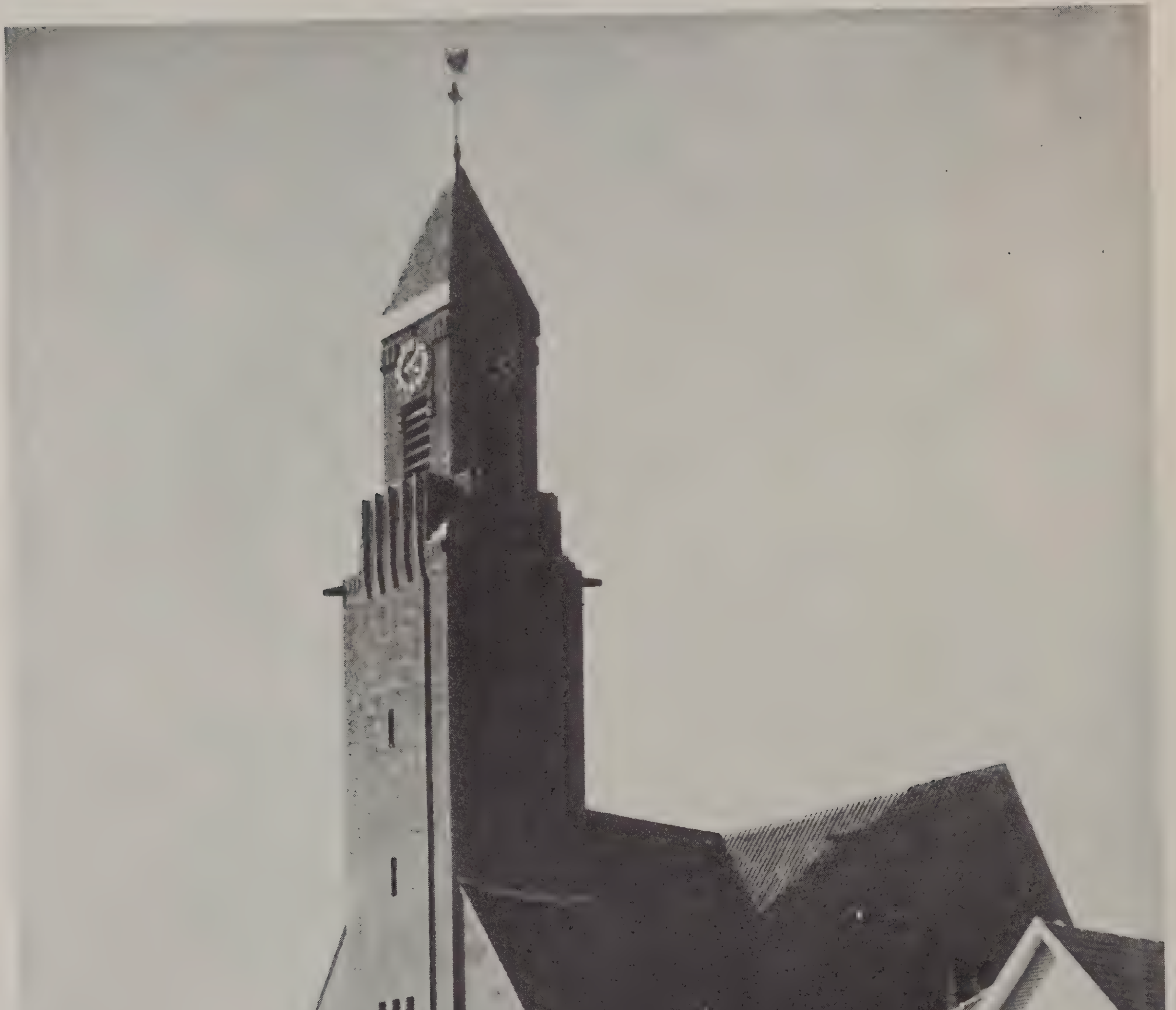


Photo. Bonney

CHURCH AT HILVERSUM, HOLLAND
D. A. VAN ZANTEN, ARCHITECT

SOME MODERN EUROPEAN CHURCHES

BY

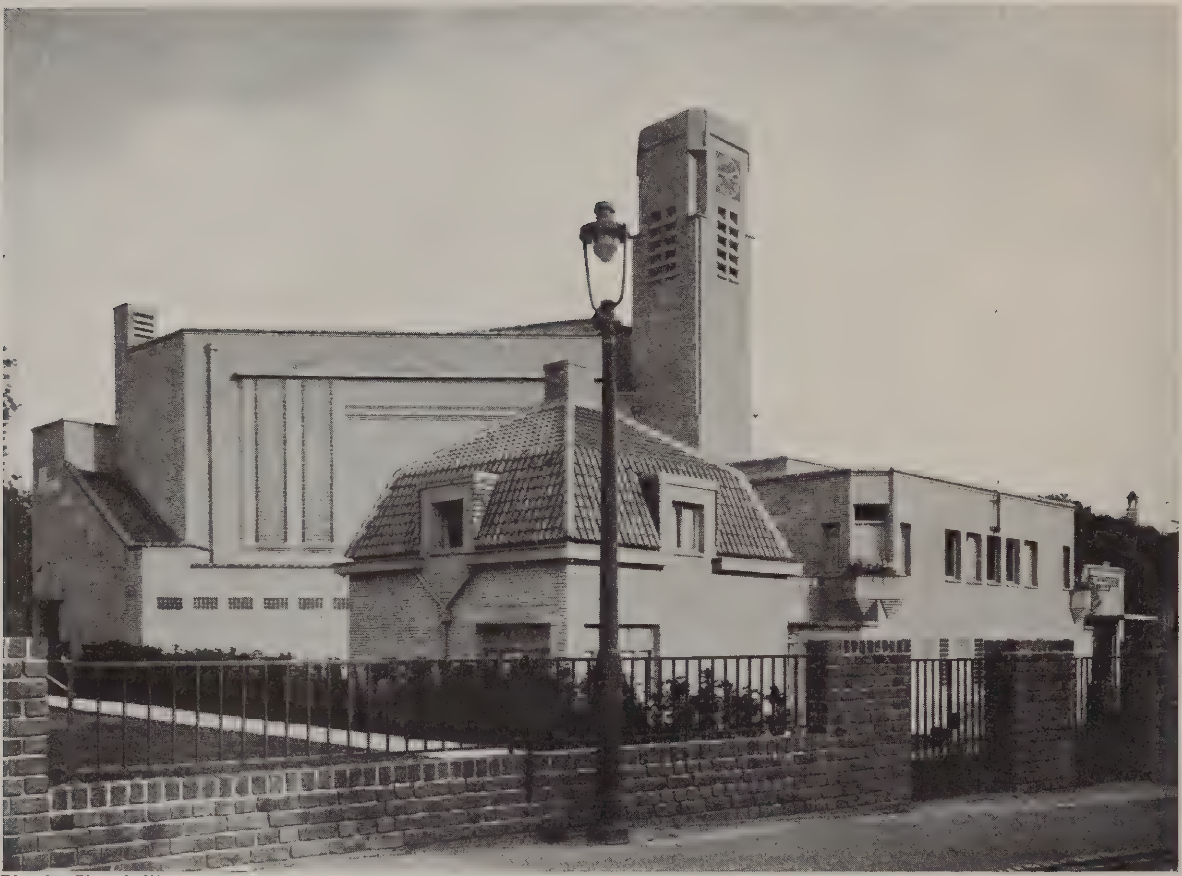
MILTON D. LOWENSTEIN

MUCH of the church architecture of the nineteenth century and of that of the early years of the twentieth abounded with ambiguous detail along with a close adherence to precedent,—an adherence in fact which was so close that it left little opportunity for originality and afforded none whatever to inspiration. The World War left its mark upon every department of life and has influenced the development of every form of art. It has been said that it brought self confidence to the victors, grim pessimism to the vanquished, while neutrals have gained something of the advantages which have accrued to both victor and vanquished, without having had to accept the disadvantages which the war brought to either.

Possibly because it is so readily observed by all observers, the influence of the period upon architecture seems to have been more marked and more striking than that made upon art in any other field. The leaven of a new age is vigorously at work, and old forms are being discarded as outworn and out of date, to be replaced by other forms new and highly spectacular,—at times even grotesque. Every country of northern Europe is developing anew its distinctive architectural forms, and the student of architecture may observe the development of each national type and note what might be called the animating spirit of each. Particularly interesting seems to be the development of German architecture during the past decade. From the anticipation of conquest bewildering in its magnitude, the German people were cast down to the most abject defeat. What then more natural and more logical, when the first period of realization was over, than that Germany should set to work to build a new structure,—new spiritually as well as politically,—and that the new should by its very form strive to render its garb as different as possible from what had been known before? Architecture, like art of every form, has high spiritual qualities, and its very functions render these qualities conspicuous. To architecture, therefore, has fallen the office of expressing most audibly to the modern world the present state of German art.

The modern church has succeeded in uniting many of the diverse elements of a complex social organization. It is only when this contrast and contiguity exist that we are sure we are beholding artistic worth. Von Ogden Vogt, writing of the artist in general, said: "As a man and a citizen he is required to stand apart and to be an onlooker. I believe that it makes a profound difference as to which is the real self of the artist and which is his assumed dramatic role. If his real self is the spectator, and he merely makes dramatic excursions into real life, I think his art will be bad art. If his real self is a man and a citizen, and he makes the supremely dramatic effort of imaginative withdrawal, I think his art will be good art."

The accompanying illustrations of a few of the recently completed European churches may be studied to advantage. The church on Tempelhofer Field, Berlin, typifies the form of the material employed in its wall. But how genuinely sincere is the dispostion of the masses! Solids, voids and reveals are combined with a just appreciation of all the practical ends desired. The roof, which in the meanest German building is always an ennobling feature, attains a perfect balance in this church. There are compromises in the building's austerity, but except for the interior of the vault where the architect succumbs to the temptation offered by the great expanse of material, the deviations are necessary to accentuate the dominant truth. The northern love of material for its own sake is tempered in the Scandinavian countries by a pride in local tradition. Religion to be religion must bear the same relation to the Scandinavian as it did to his mediæval ancestor. His spirit has not changed except in that it has adapted itself to a larger group. The church to be adequate must express wide influence. Architectonically, it must take account of the national highly colored imagination and an elf-like piquancy in character, which has been much suppressed by contemporary civilization. One is allowed a glimpse into this hinterland of the spirit in the creation of the architect, Jensen-Klint. The tower of the Grundtvig Church fairly aches for the voice of some leader who will unite Earth to a stranger Heaven. More chaste, yet not less significant are the towers of Hogalid's Church in Stockholm. To hold a simple gabled facade between two octagonal towers that extend straight up from the ground without keeping them aloof or cramping the building was a problem solved by an eye long accustomed to exercising good judgment and immune to petty artifices. No intermediary breaks, offsets or string courses are employed, but the right proportions of the principal elements themselves constitute a unity. The doorway by itself is a sturdy conception with perhaps too great an insistence of logic in the details. Its consistency with the entire facade cannot be judged from the illustration where the doorway is screened. The interior is



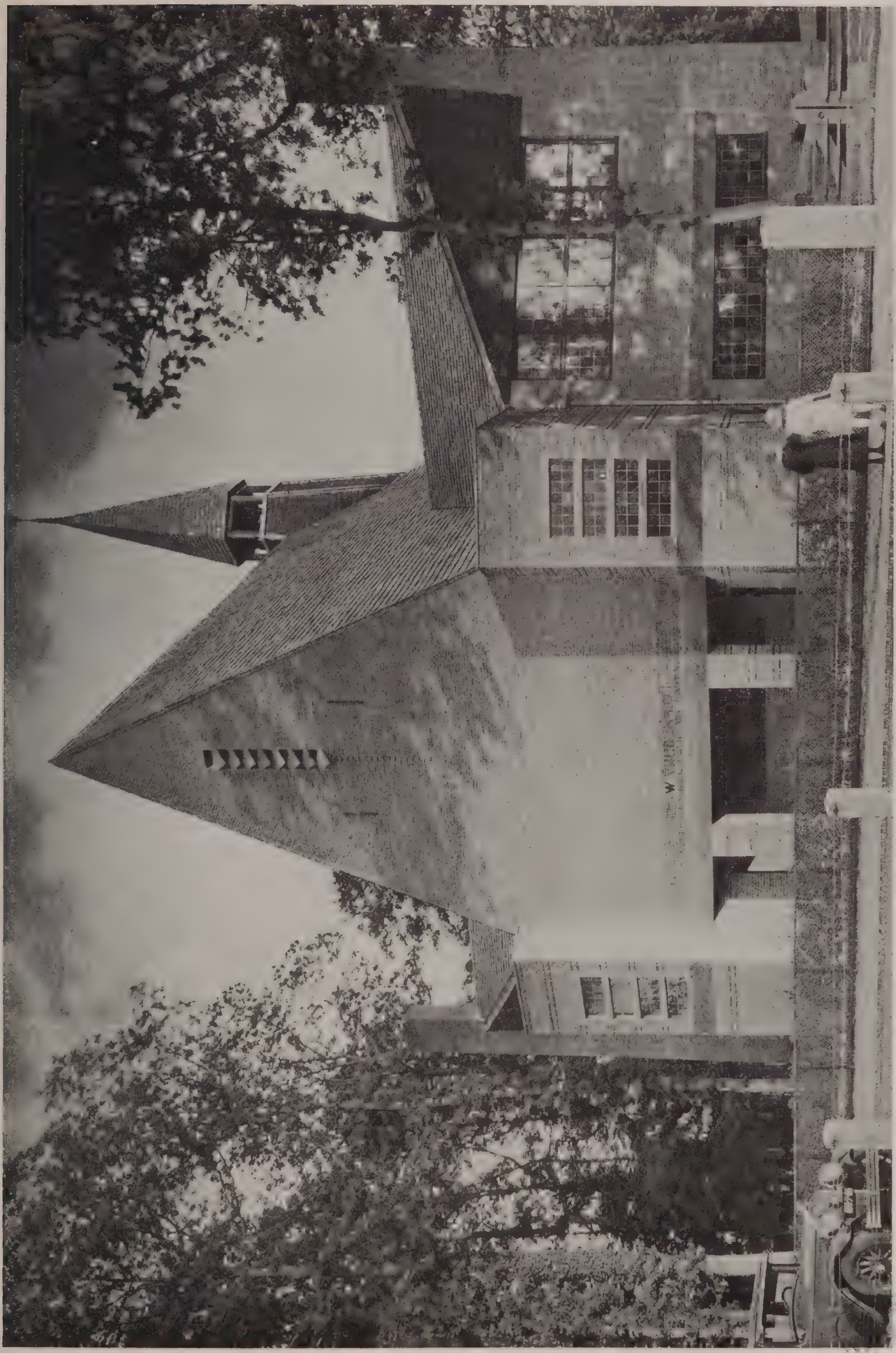
Photos, Sigurd Fischer

First Church of Christ, Scientist, The Hague

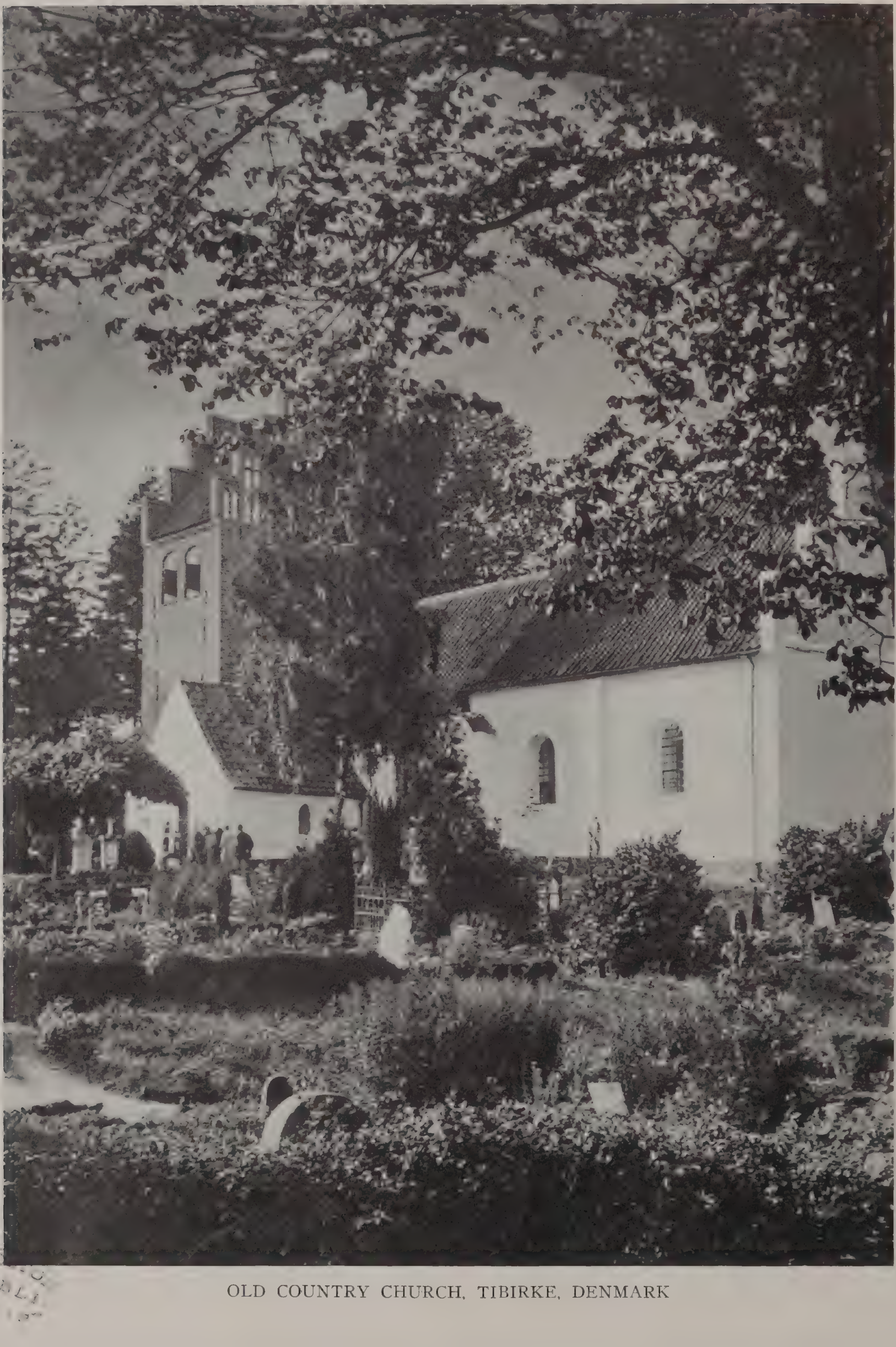
H. P. Berlage, Architect

cold and terribly reasonable, but like the golden snake upon which the stricken Israelites had to gaze in order to free themselves of the vipers, the church's frigidity ought to unshackle the self-conscious beholder. The two examples from Holland show the influence of men who have been able to raise themselves above many transient cares in order to suggest some solution to their less fortunate compatriots. To the unpracticed American eye these unpretentious structures are too barnlike to be taken seriously. But, on the contrary, they were created by men whose knowledge of their material and its purpose precluded any longing for academic "style." This kind of art is alive, and like warfare, it leaves to posterity the problem of finding an historical *raison d'etre.* That it be synchronous with contemporary life is all we may ask of art; great art may do more, but the privilege of finding the tradition of the present must be left to posterity. In the works of Delorme we find traces of that decadence which characterizes the downfall of the so-called Gothic style. He is beginning to love his material without regard to the purpose it serves. The artist must maintain the sensitivity of his spirit as well as the facility of his physical powers. "The sounding board which vibrates in us is our criterion of harmony," writes the French architect, Le Corbusier. "This is indeed the axis on which man is organized in perfect accord with nature and probably with the universe, this axis of organization, which must be that on which all phenomena and all objects of nature are based; this axis leads us to assume a unity of conduct in the universe and to admit a single will behind it."

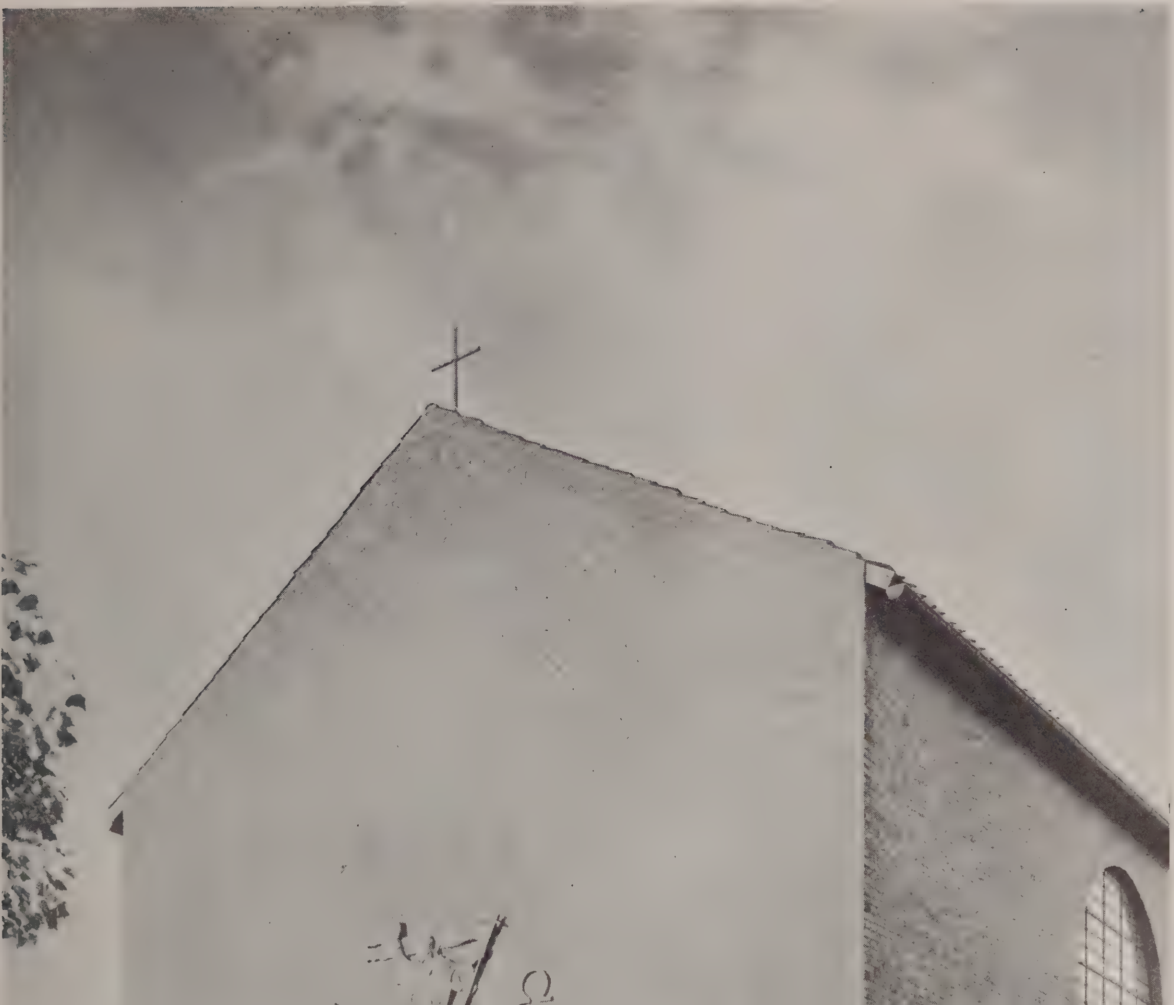
Editor's Note. The spirit of freedom which has entered into a great deal of contemporary European architecture has not been confined to public, commercial, institutional or domestic buildings. This new expression has evidenced itself quite as much in ecclesiastical architecture. People who find it difficult to understand, or be sympathetic to, the new architectural expression will undoubtedly find it difficult to reconcile themselves to a type of church architecture in which there is very little suggestion of the influence of precedent. In ecclesiastical architecture, perhaps more than in any other, some adherence to the architecture of the past is still demanded by most people. However, as a record of current architectural design in Europe it is reasonable and justifiable to publish these interesting churches.



NIEUW VREDENHOF CHAPEL, HAARLEM
H. KORRINGA, ARCHITECT



OLD COUNTRY CHURCH, TIBIRKE, DENMARK



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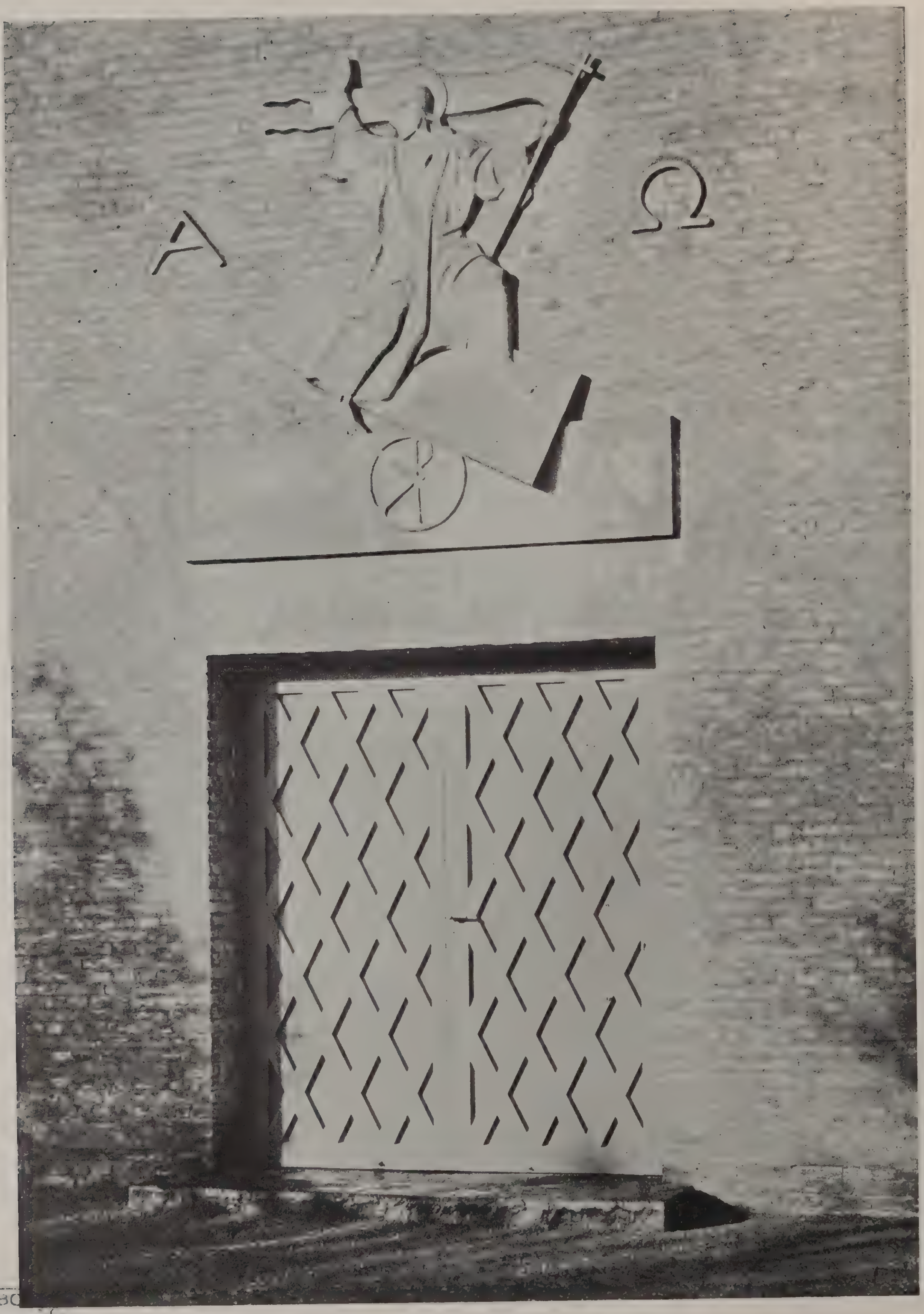
CHAPEL, ORDRUP CEMETERY, DENMARK
EDWARD THOMSEN, ARCHITECT



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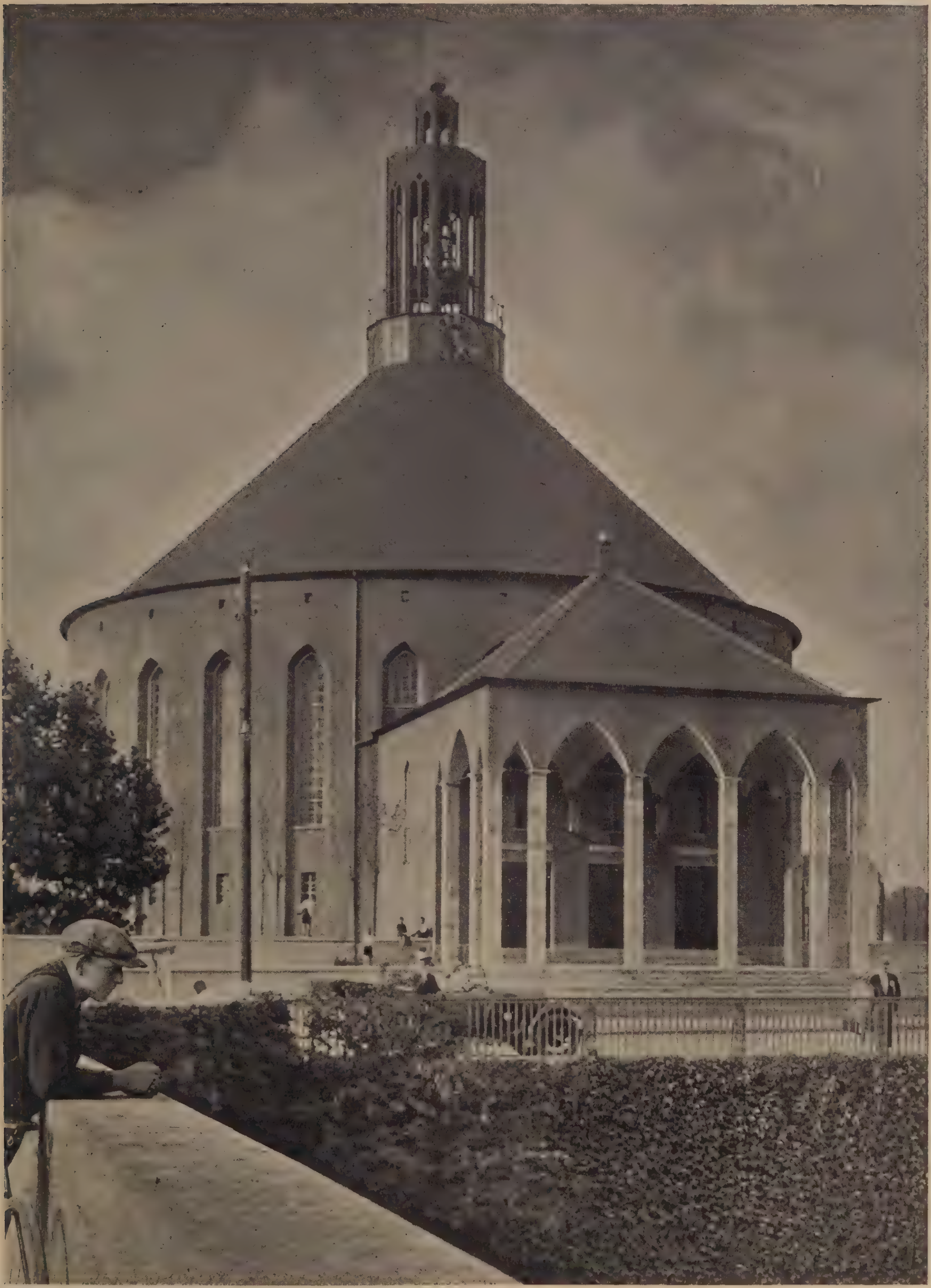
ENTRANCE DOOR
CHAPEL AT ORDRUP CEMETERY, DENMARK
EDWARD THOMSEN, ARCHITECT



Photos. Sigurd Fischer

CHURCH ON TEMPELHOFER FIELD, BERLIN
STADTBAURAT BRAUNING, ARCHITECT

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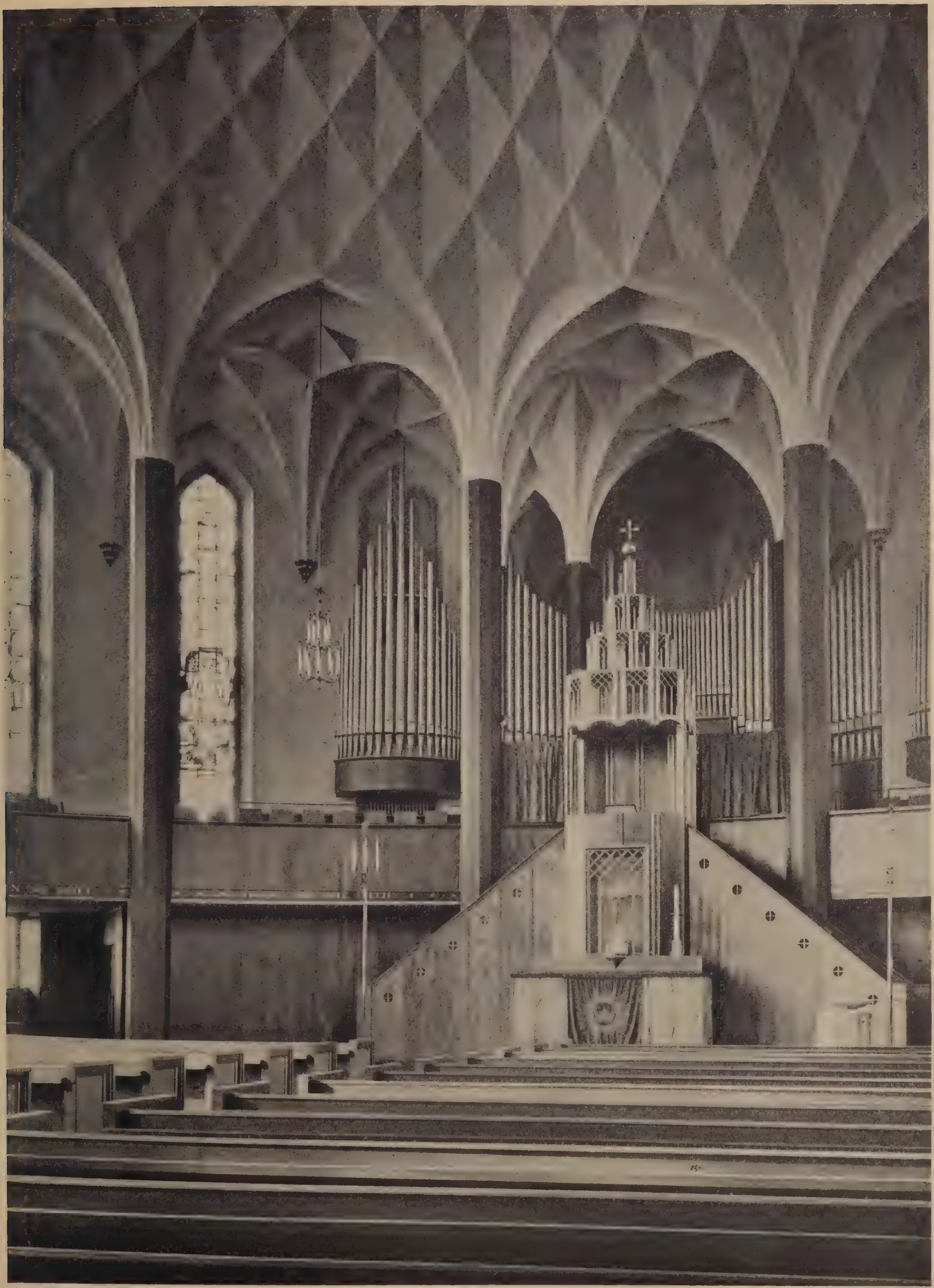
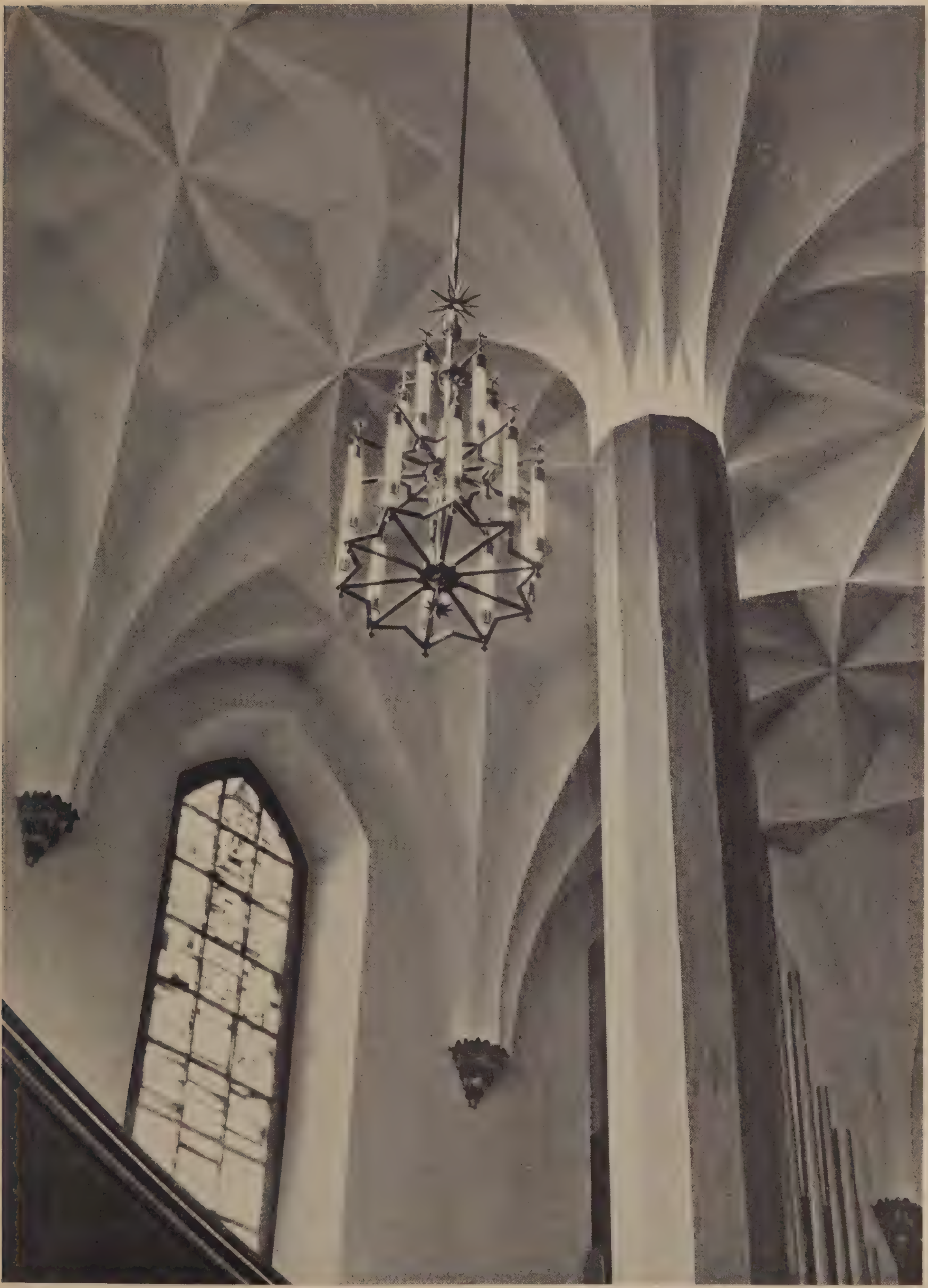
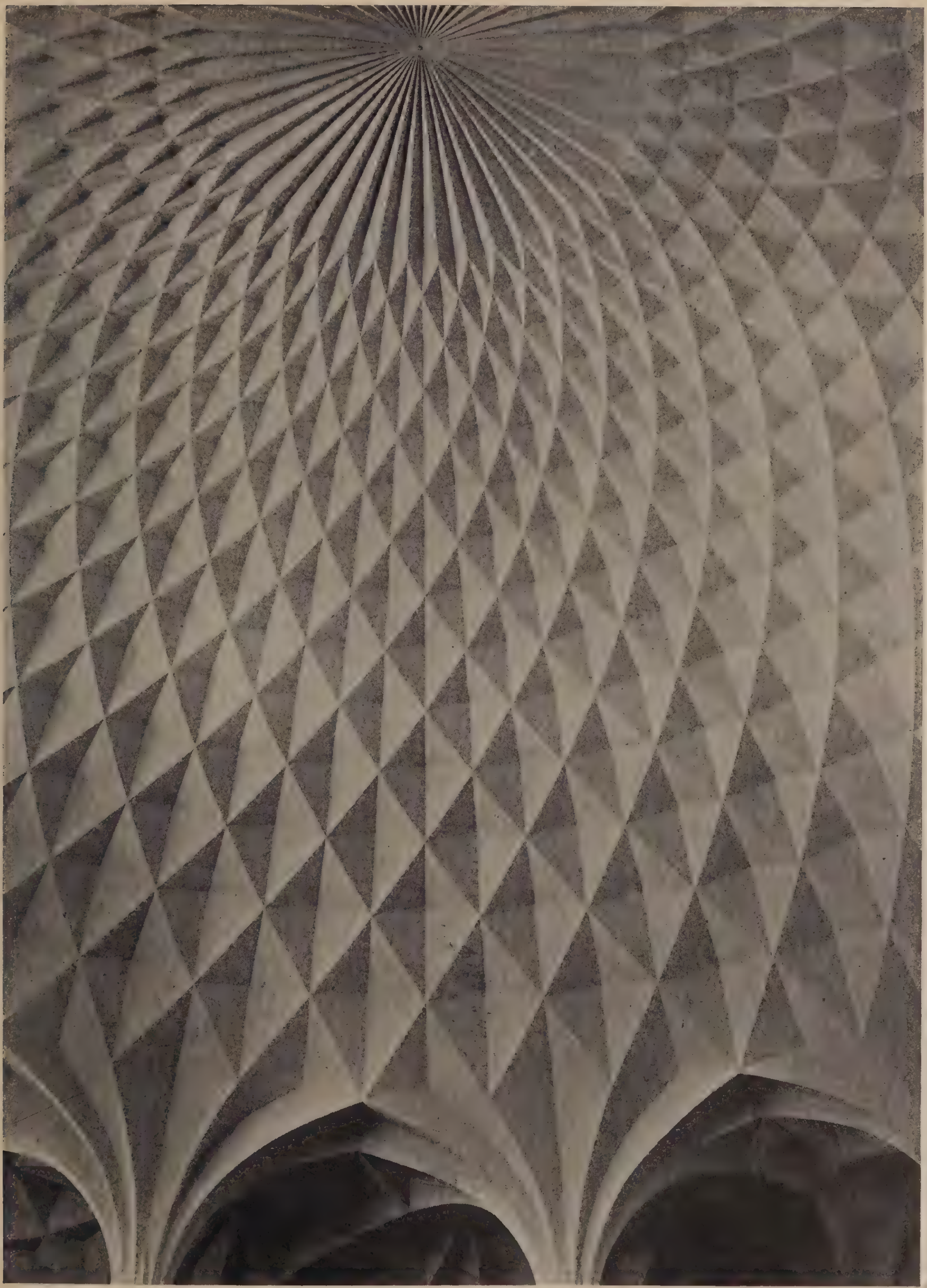


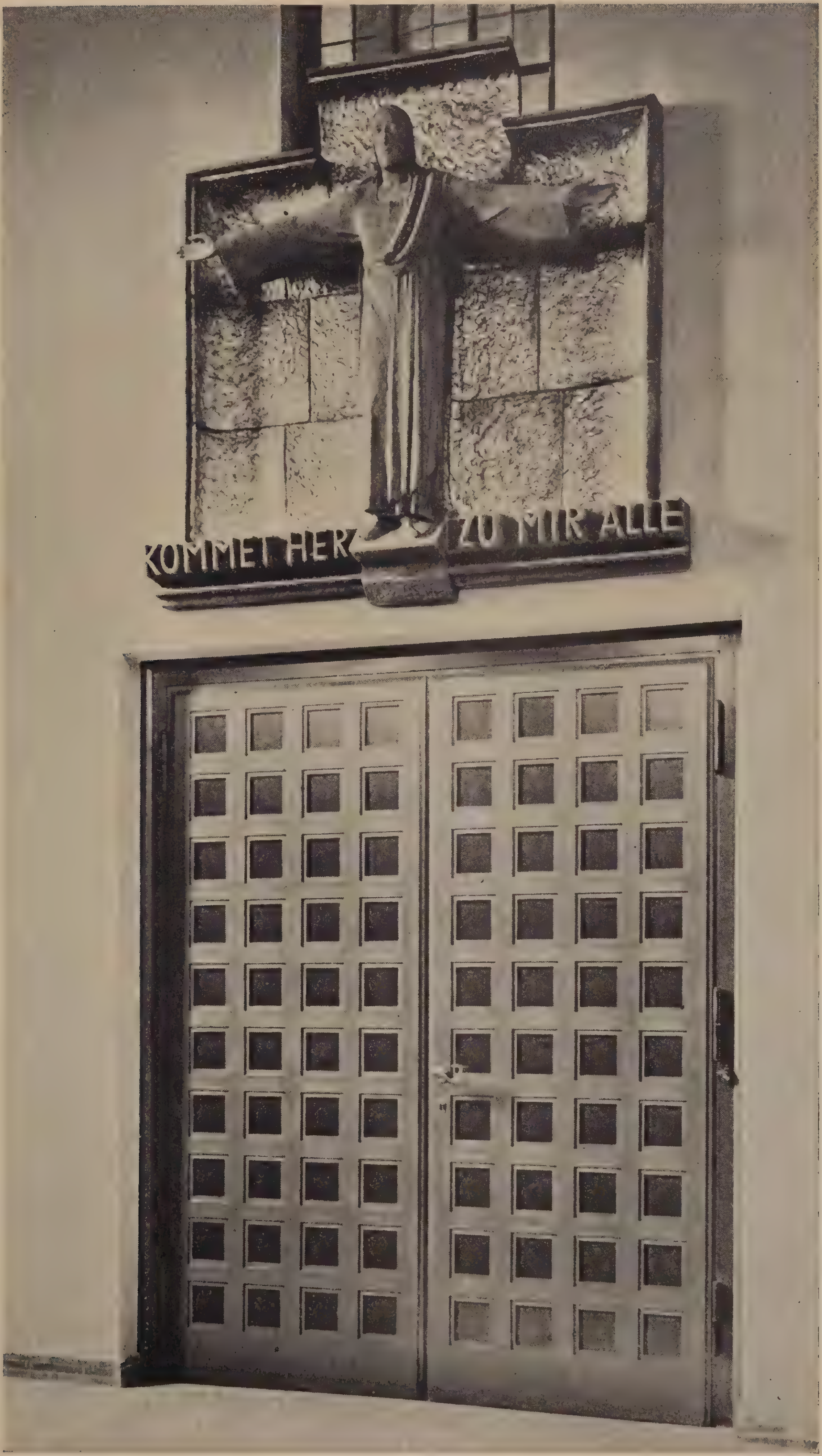
INTERIOR, CHURCH ON TEMPELHOFER FIELD, BERLIN
STADTBAURAT BRAUNING, ARCHITECT



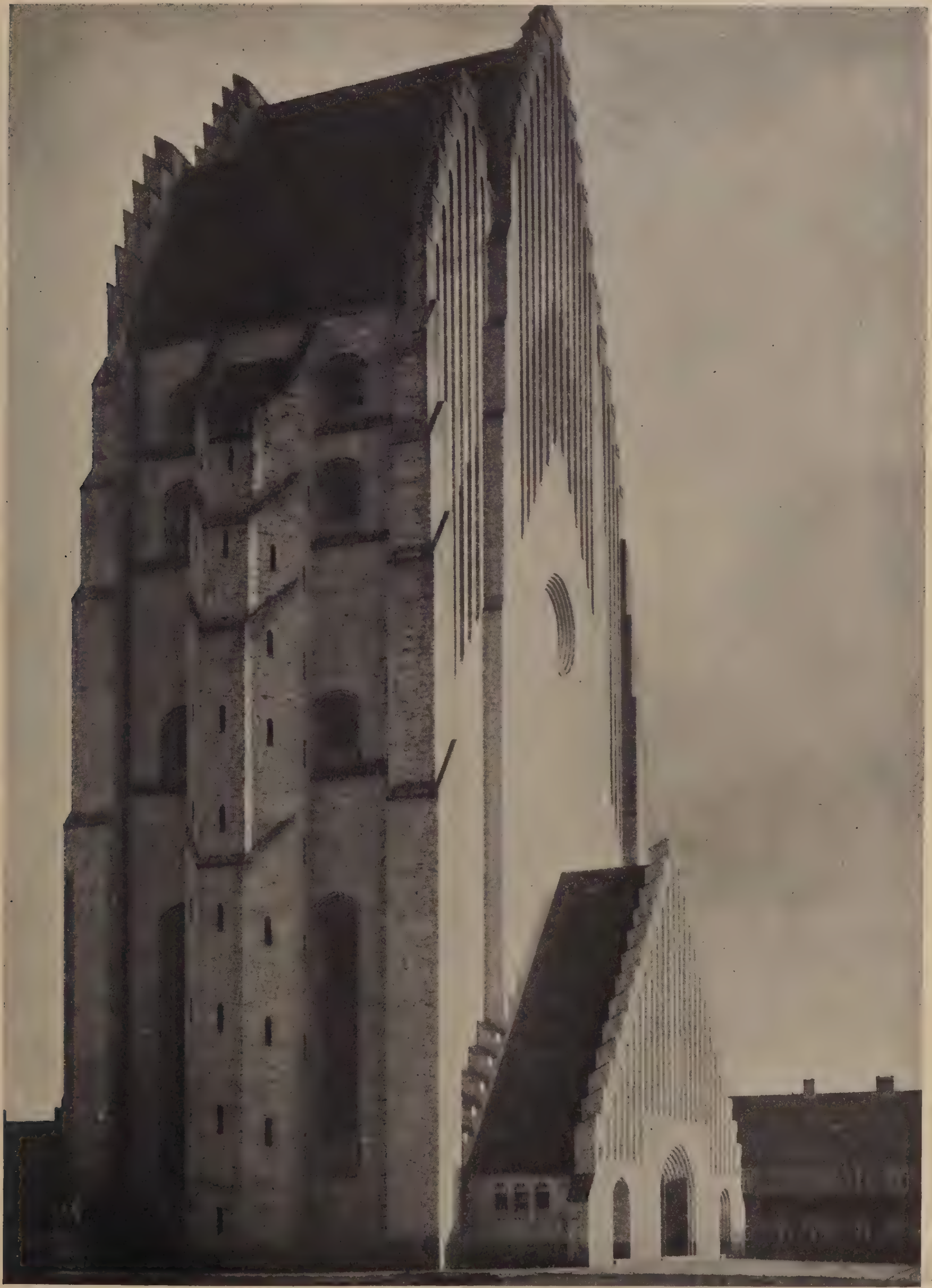
INTERIOR DETAIL
CHURCH ON TEMPELHOFER FIELD, BERLIN
STADTBAURAT BRAUNING, ARCHITECT



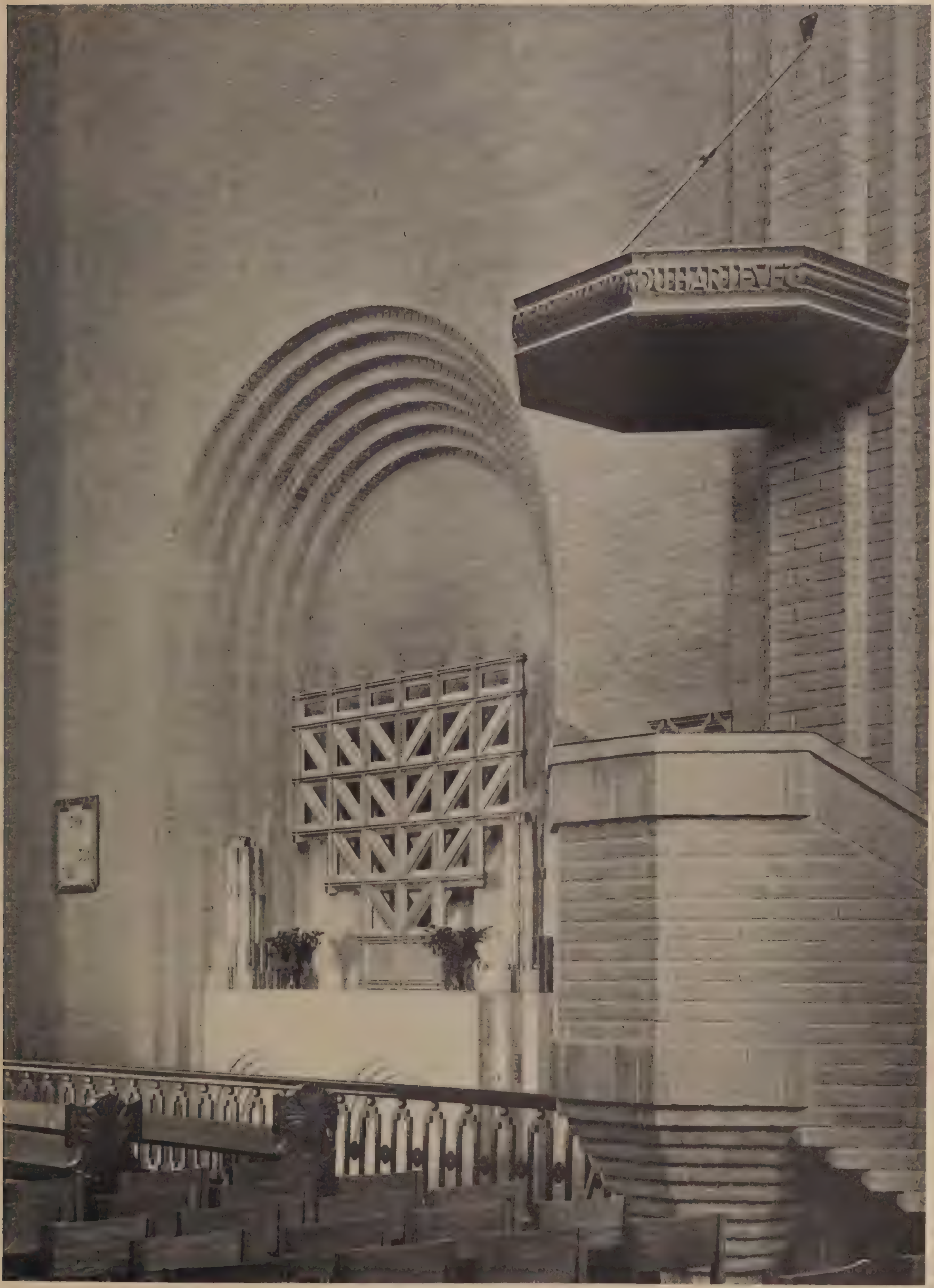
DETAIL OF CEILING
CHURCH ON TEMPELHOFER FIELD, BERLIN
STADTBAURAT BRAUNING, ARCHITECT



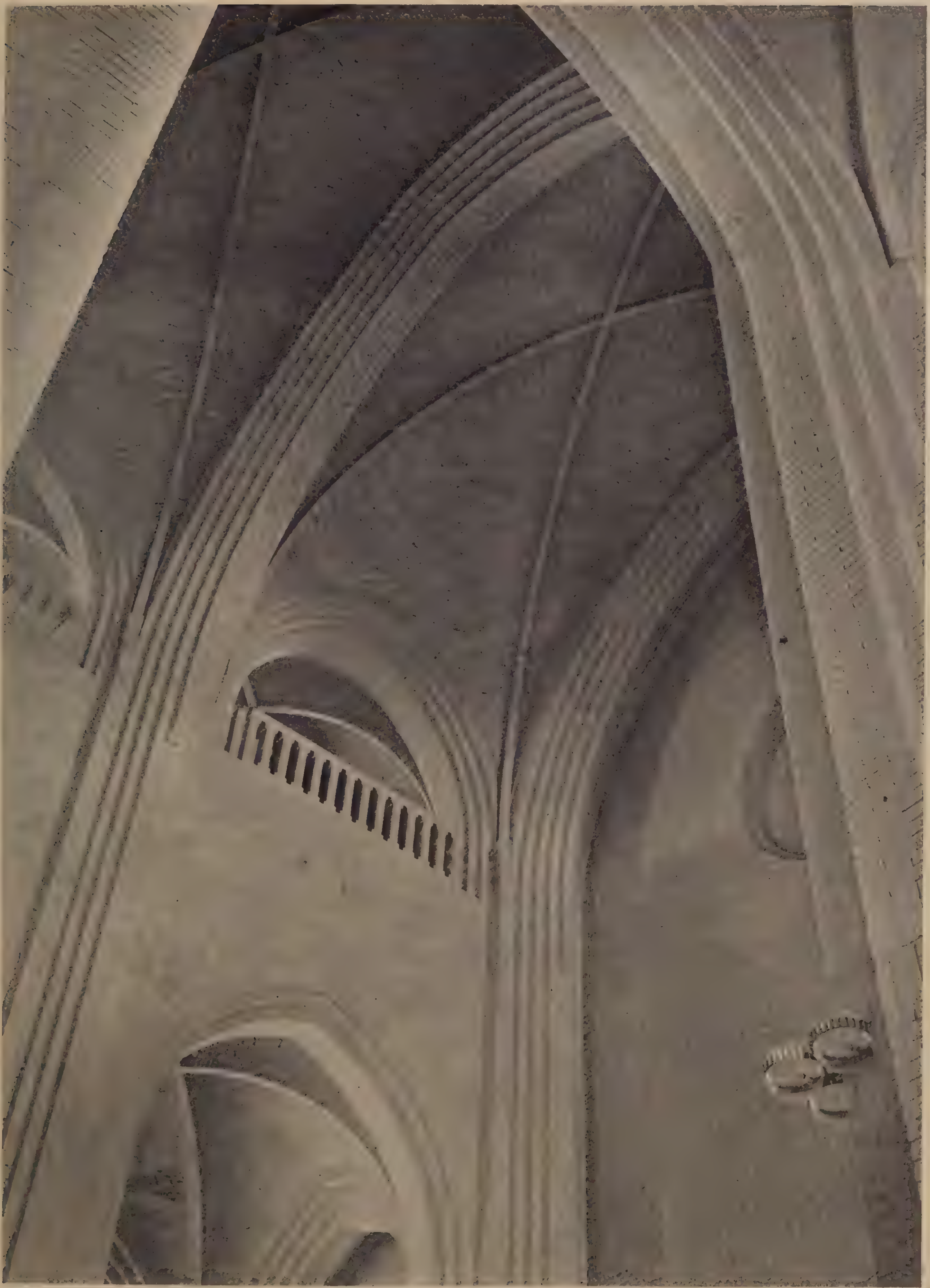
DOOR FROM VESTIBULE TO CHURCH
CHURCH ON TEMPELHOFER FIELD, BERLIN
STADTBAURAT BRAUNING, ARCHITECT



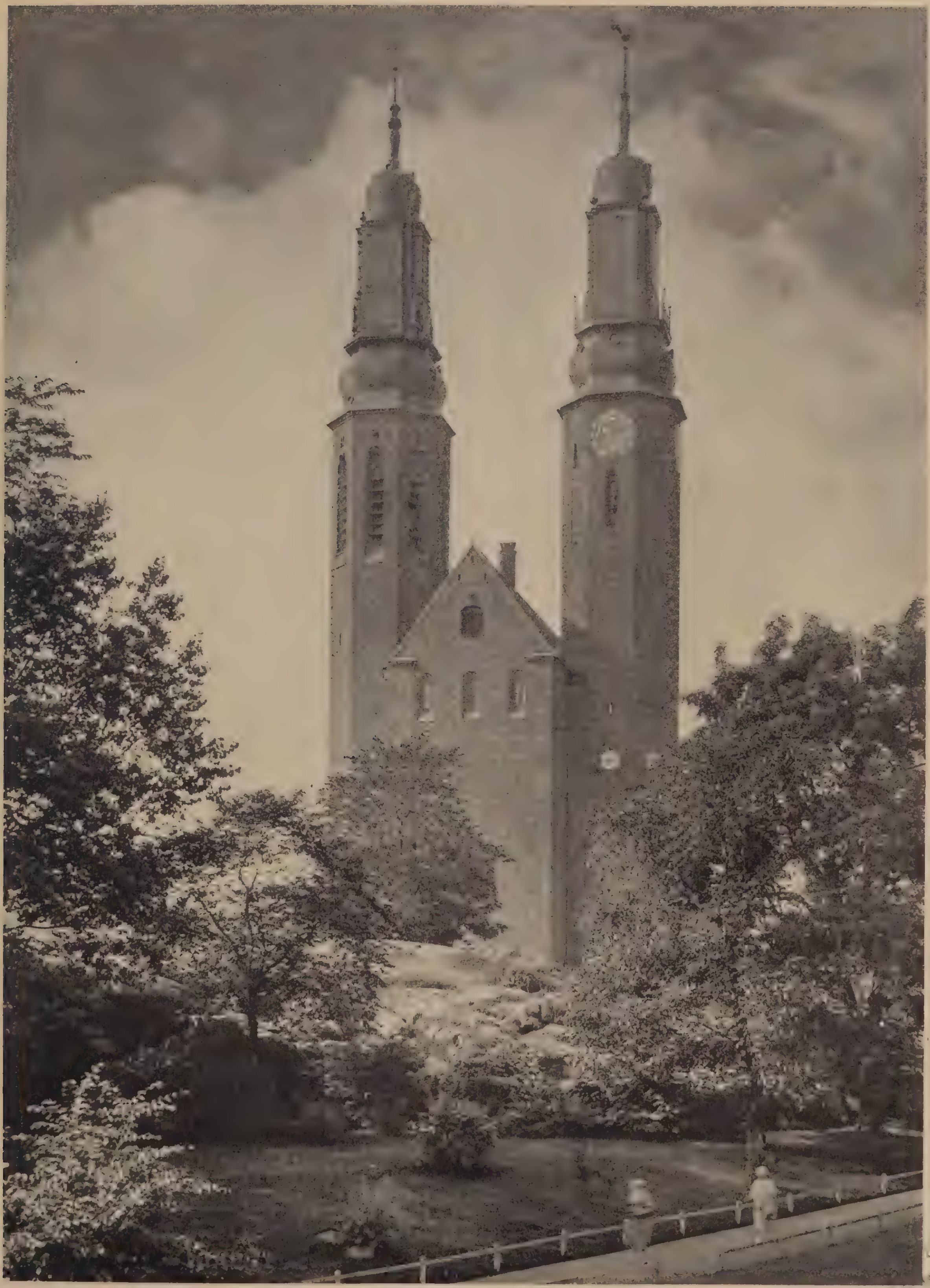
GRUNDTVIG CHURCH, COPENHAGEN
P. V. JENSEN-KLINT, ARCHITECT



DETAIL TEMPORARY CHAPEL IN TOWER
GRUNDTVIG CHURCH, COPENHAGEN
P. V. JENSEN-KLINT, ARCHITECT



DETAIL OF CEILING
GRUNDTVIG CHURCH, COPENHAGEN
P. V. JENSEN-KLINT, ARCHITECT



VIEW OF WEST FRONT
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT

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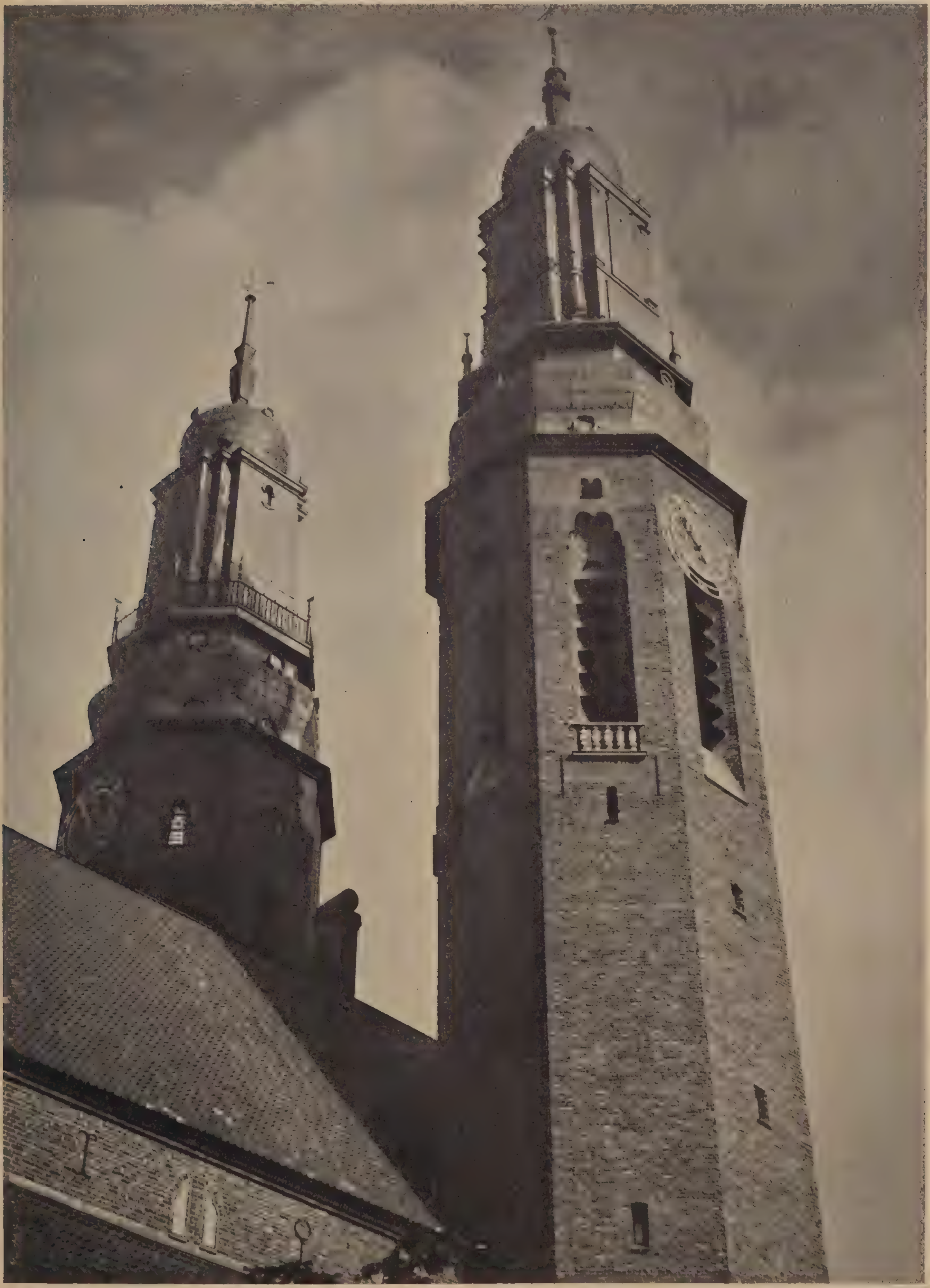
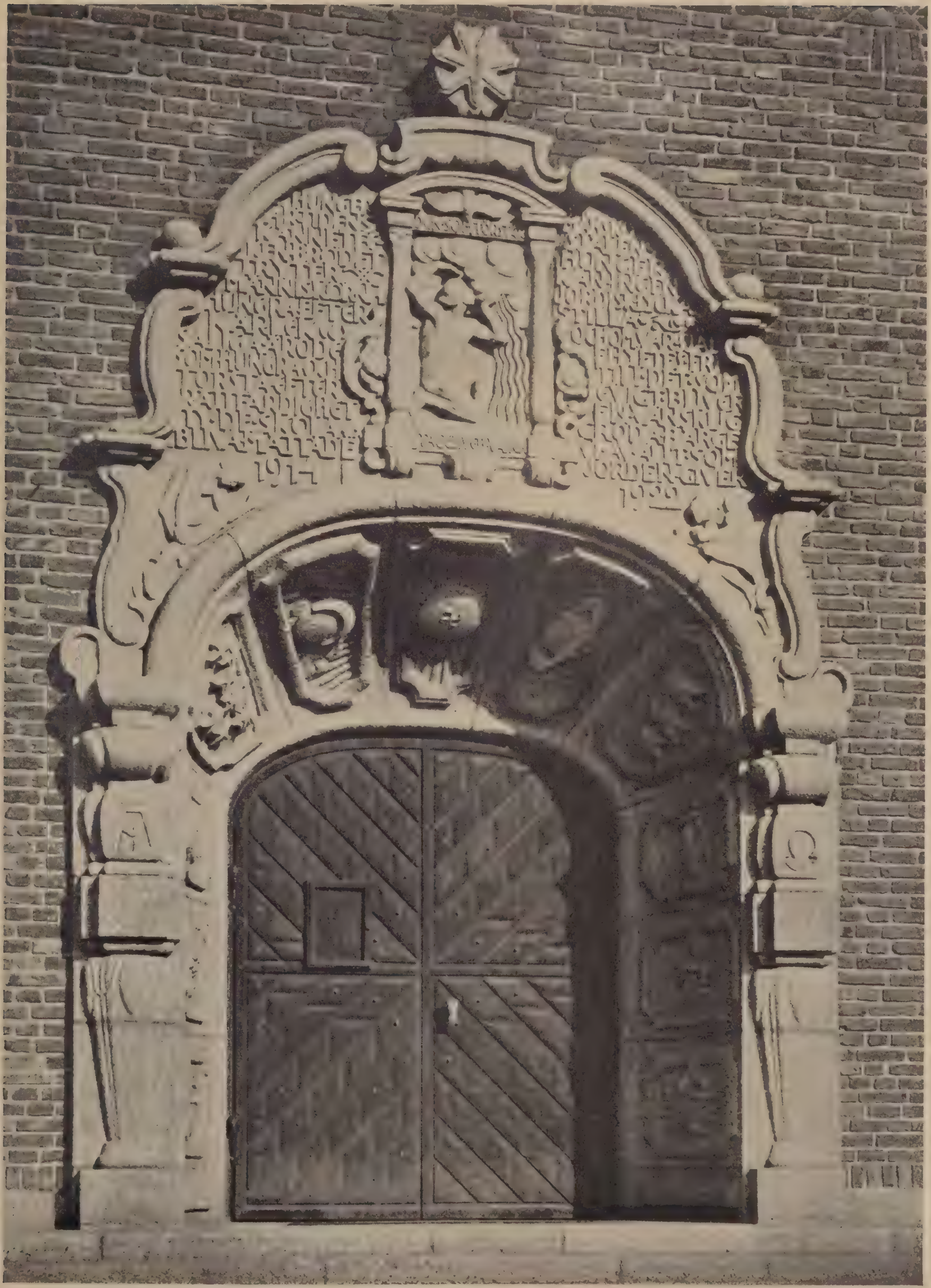
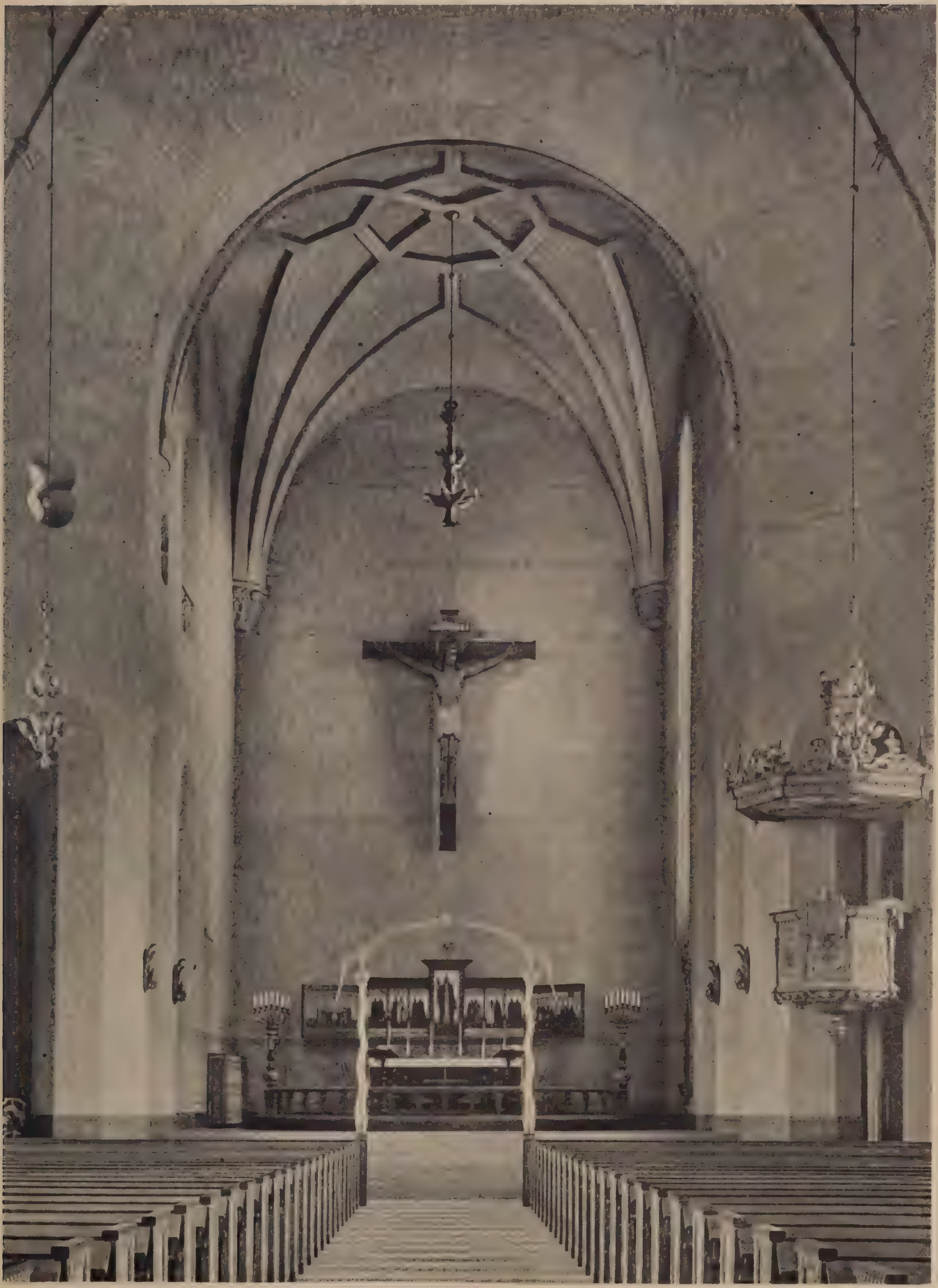


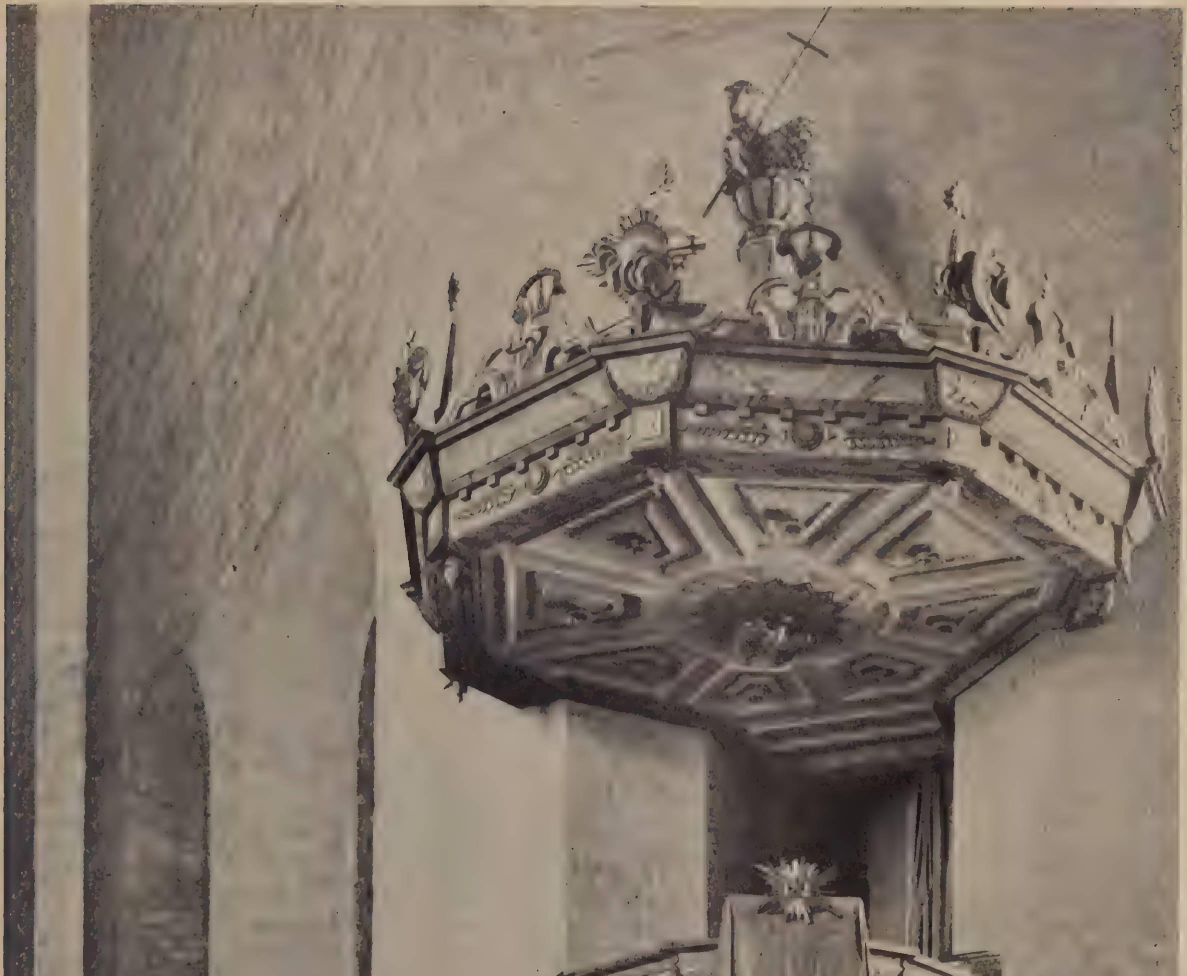
DETAIL OF TOWERS
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



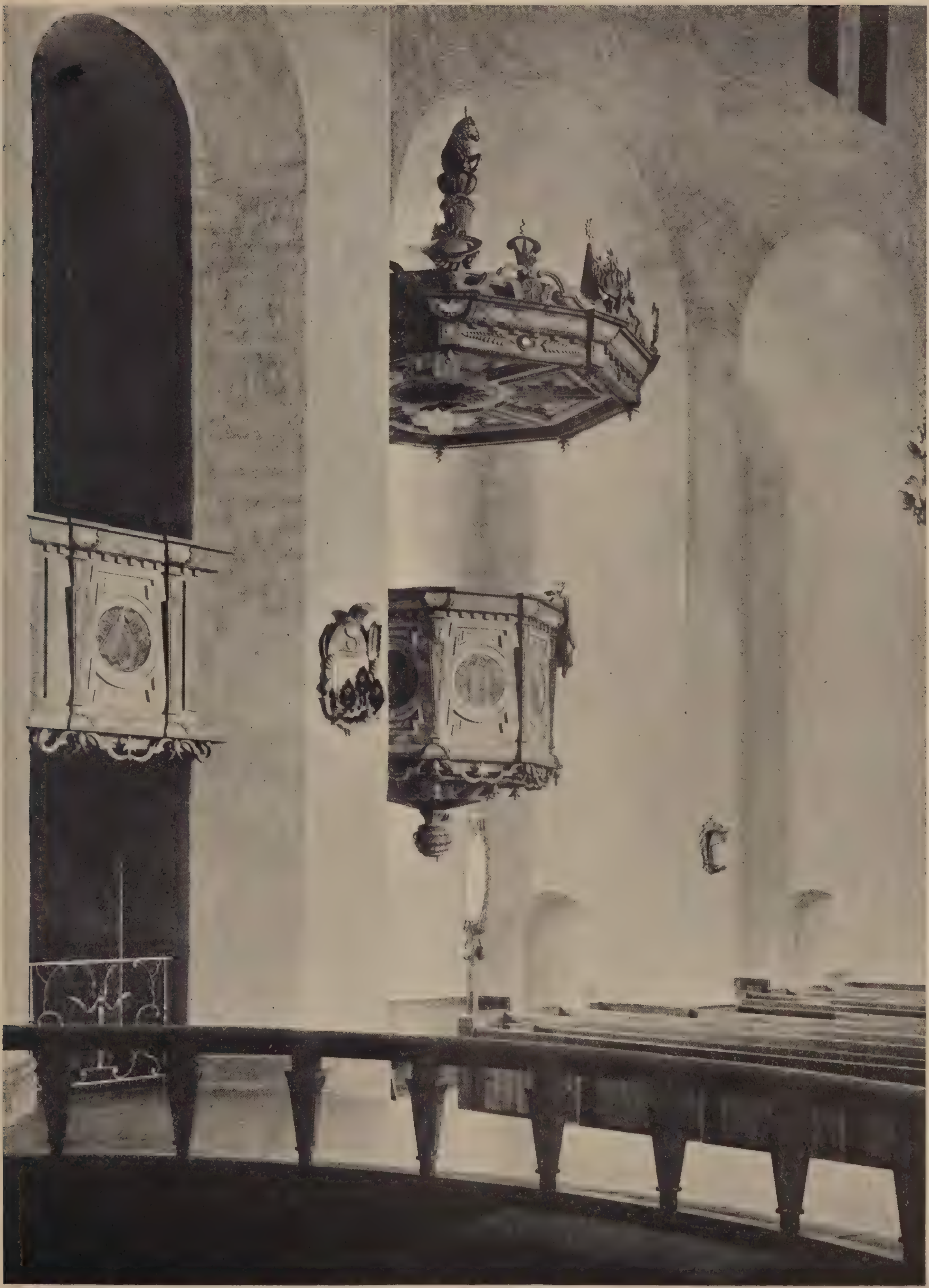
MAIN ENTRANCE
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



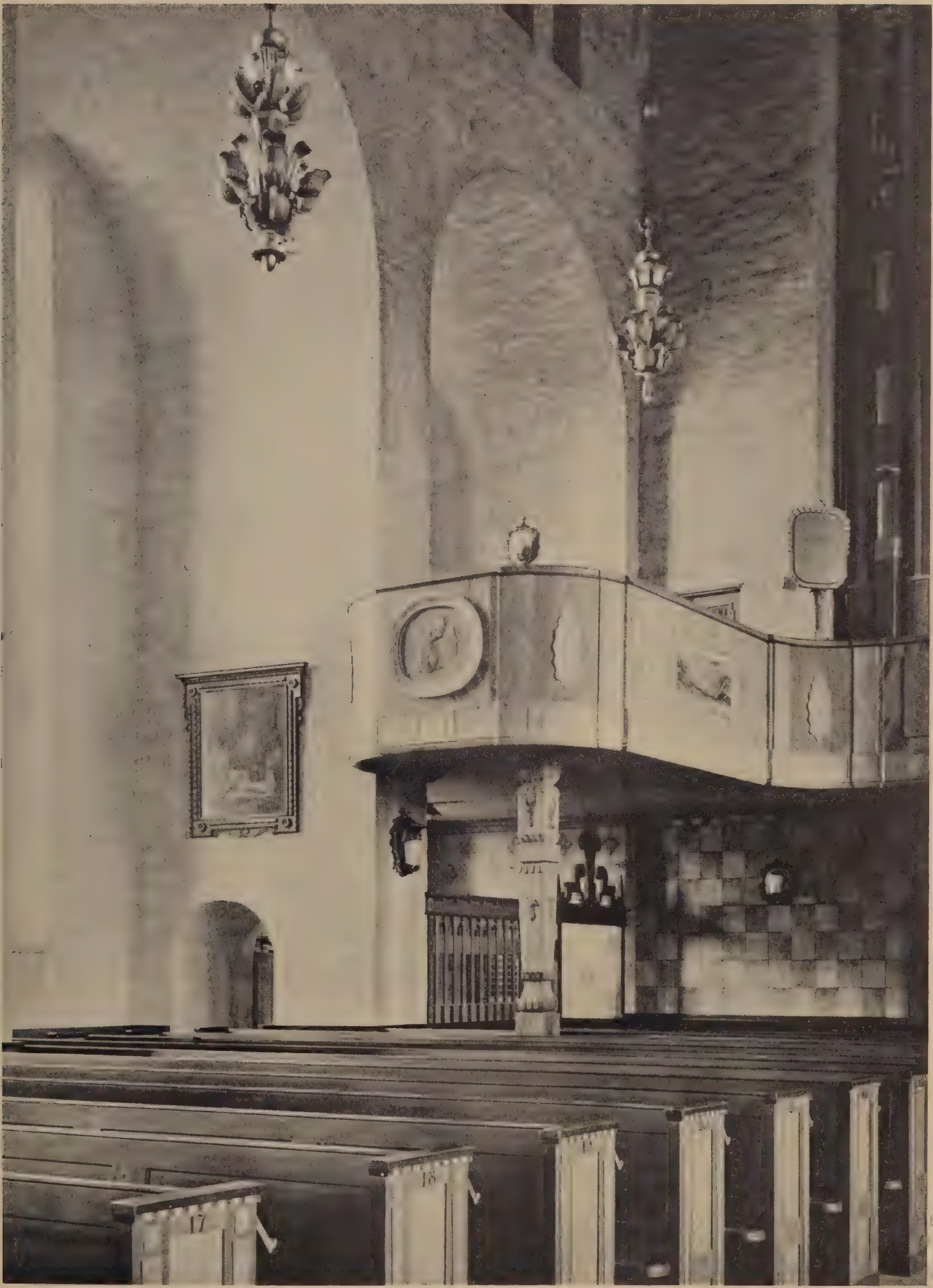
CHANCEL
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



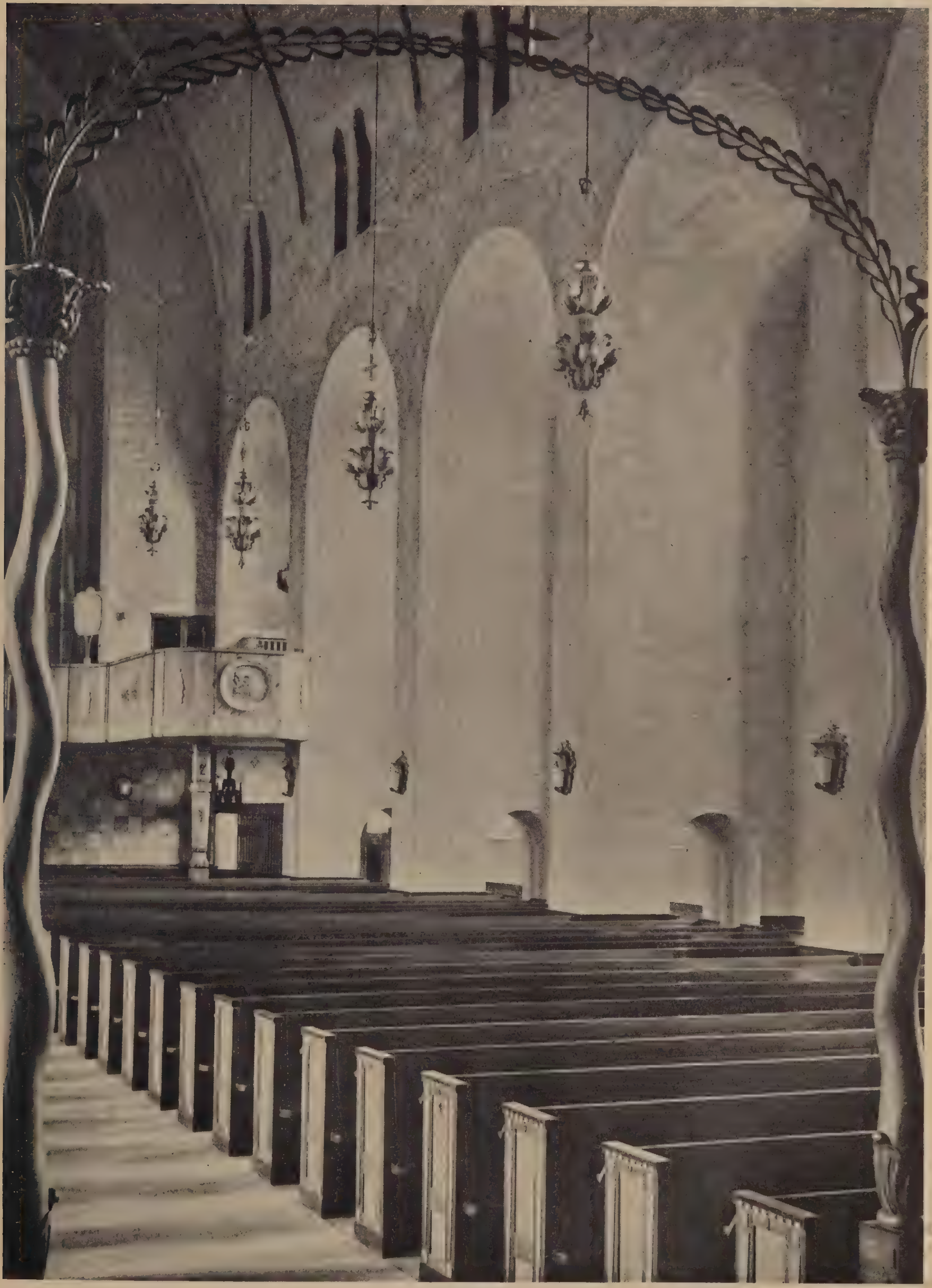
DETAIL OF PULPIT
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



VIEW FROM CHANCEL
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



DETAIL PEWS AND ORGAN BALCONY
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT



INTERIOR
HOGALID'S CHURCH, STOCKHOLM
IVAR TENGBOM, ARCHITECT

STON LIC RY

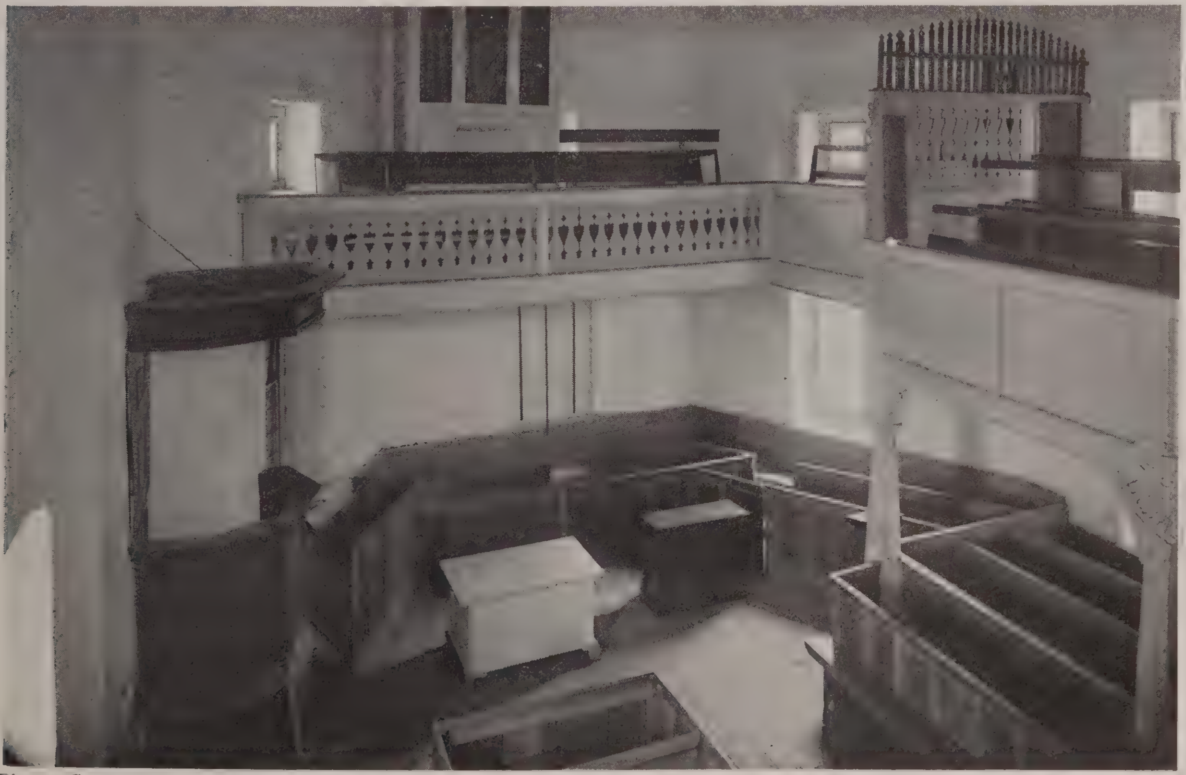
THE OLD TRAPPE CHURCH, 1743

BY

MARIE KIMBALL

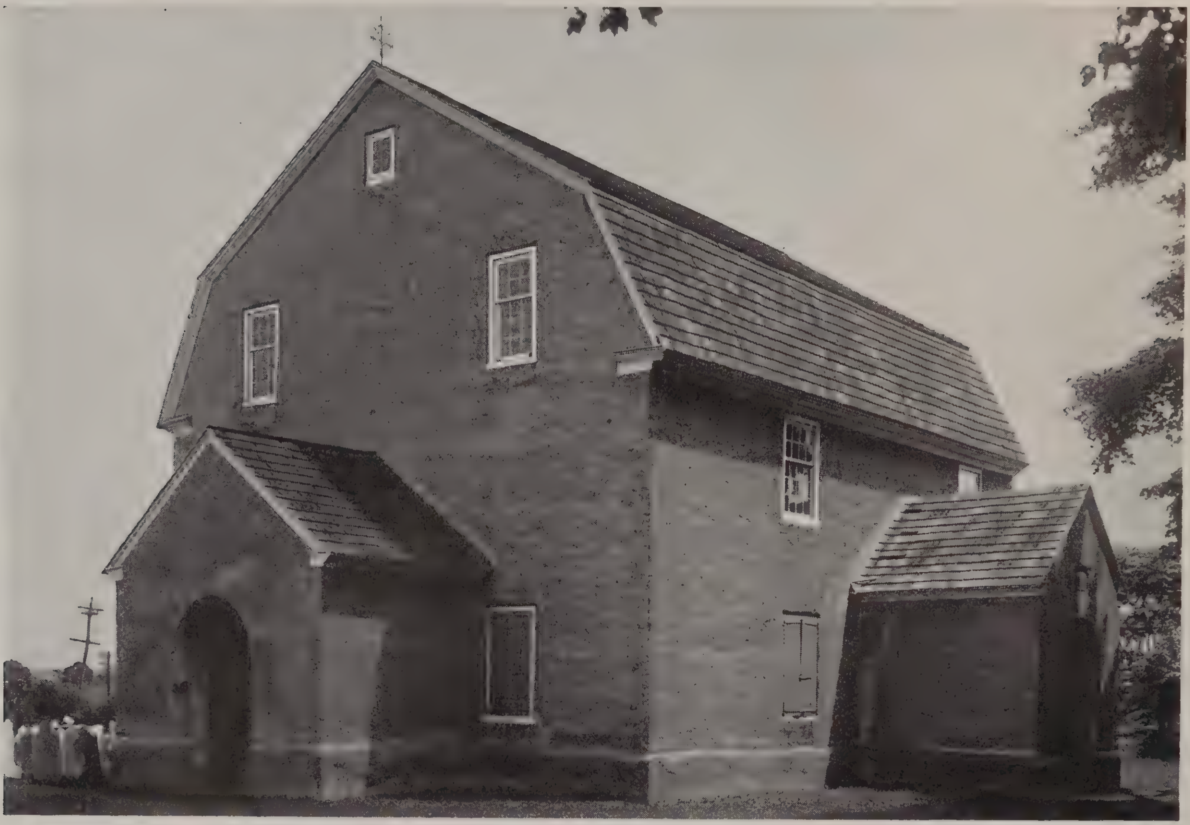
HALFWAY toward Reading, on the old turnpike connecting that city with Philadelphia, at the end of an arching avenue of trees, stands a simple, barnlike structure of sturdy dignity,—the Augustus Lutheran Church. Its ample gambrel roof and low, arched porches, and the broad, windswept surfaces of its pale brown stucco walls at once arrest attention and indicate an impressive age,—a remarkable relic of the past.

The "Old Trappe Church," as it is familiarly called, is, aside from certain buildings of the Episcopal Church, one of the oldest unspoiled houses of worship in America. Not only is the building unique in type, but on the interior we find characteristics that are survivals, unexampled elsewhere, of the forms peculiar to the seventeenth century evangelical church. It was built in 1743 by Heinrich Melchior Muehlenberg, the distinguished Lutheran divine, in the wilderness of the Perkiomen Valley, for a congregation incredibly poor and destitute but fired with a religious enthusiasm that refused to be subdued. Muehlenberg had but recently arrived from Europe and had received an initiation into the life of the new world by preaching his first sermon in an unfinished log cabin, his second in a carpenter's shop, and his third in a barn at Trappe. Fortunately, he possessed the rugged spirit of a pioneer. Undismayed, he promptly proposed to build a suitable house of worship. No record exists as to who designed the church, but it is not improbable that Muehlenberg was his own architect. In the reports which he sent at frequent intervals to the mother church at Halle, he said that he "attached a plan of a stone church" to the communication he gave the elders to carry about in soliciting subscriptions. It was specified, in the old manner, even now not uncommon in the Pennsylvania-German country, that the church should be "54 Schuh lang bei 39 Schuh breit" and an ample supply of "Rom und Brandwein" was promised the masons for their labors. The estimated cost of the building, as Muehlenberg faithfully wrote to Germany, was £200 sterling, and £100 were immediately subscribed. An appeal to Europe brought help from the German preacher at the Court of St. James, and the church was begun. The very poor in the congregation, who were unable to give money, hauled stone and split shingles for the building, and aided in other ways.



Photos. Courtesy of the Pennsylvania Museum

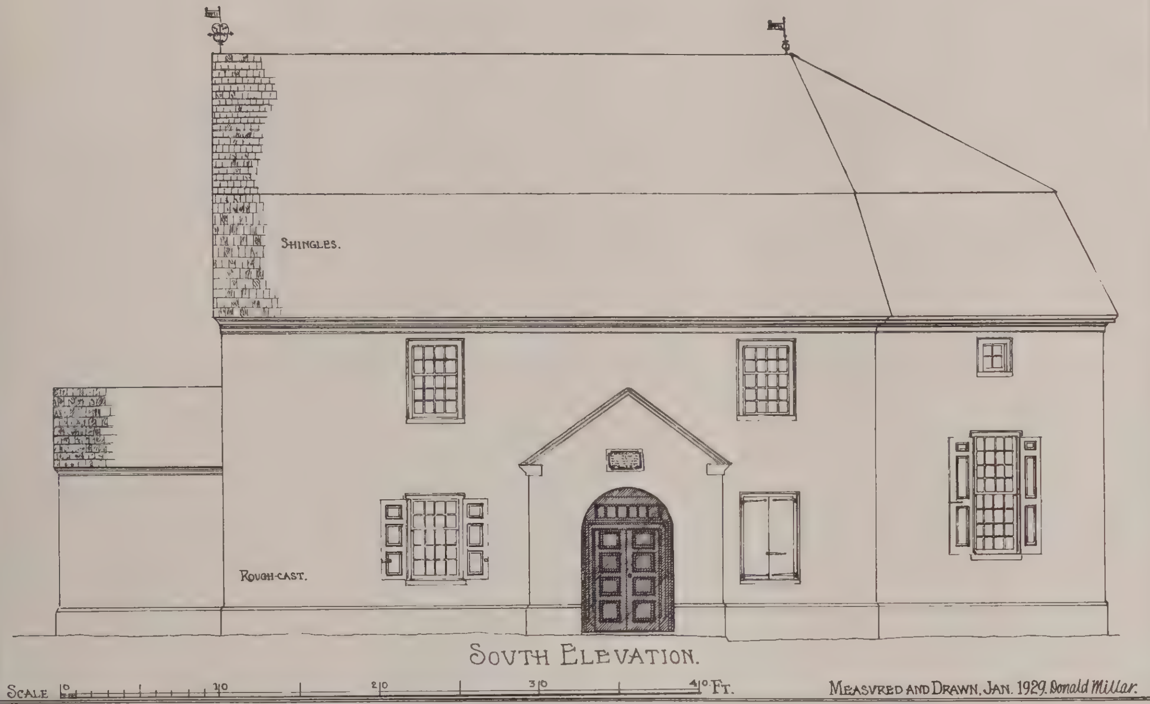
Augustus Lutheran Church, Trappe, Pa.



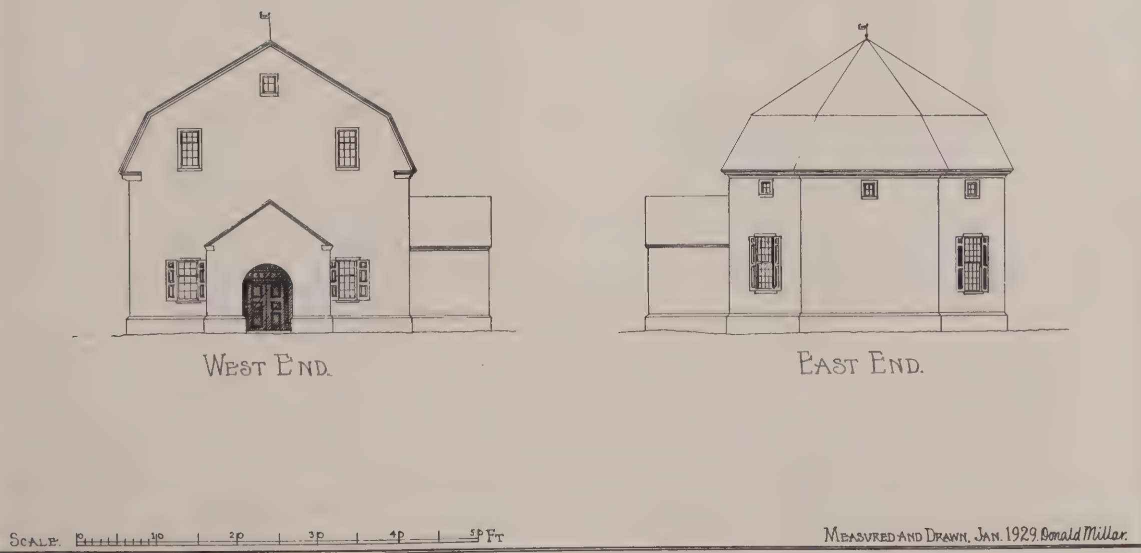
WEST ELEVATION

EAST ELEVATION

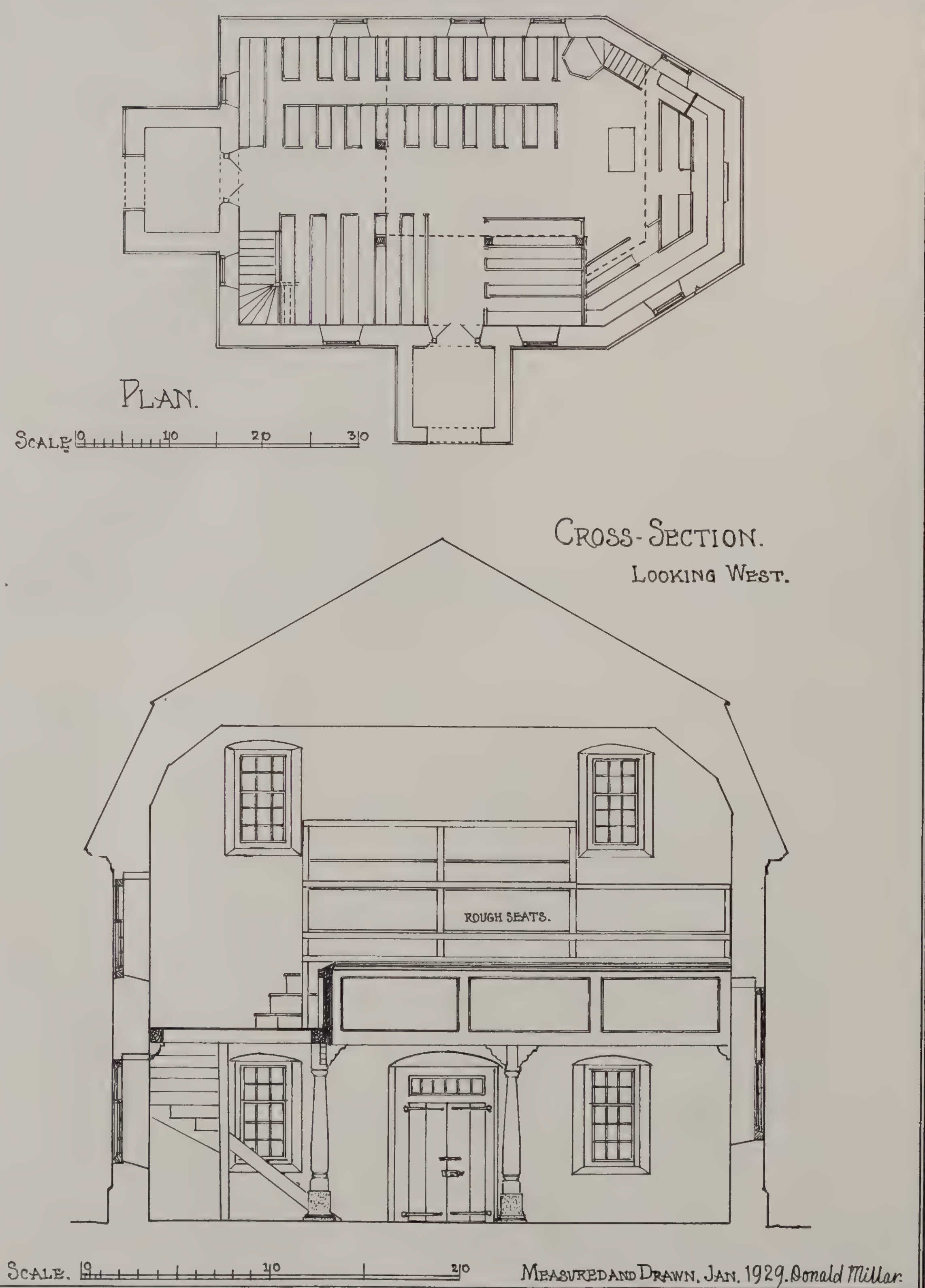
AUGUSTUS LUTHERAN CHURCH, TRAPPE, PA.



AUGUSTUS LUTHERAN CHURCH, TRAPPE, PENNSYLVANIA. 1743.


West End.
East End.
Scale 0 10 20 30 40 50 Ft.
Measured and Drawn. Jan. 1929. Donald Millar.

AUGUSTUS LUTHERAN CHURCH, TRAPPE, PENNSYLVANIA. 1743.

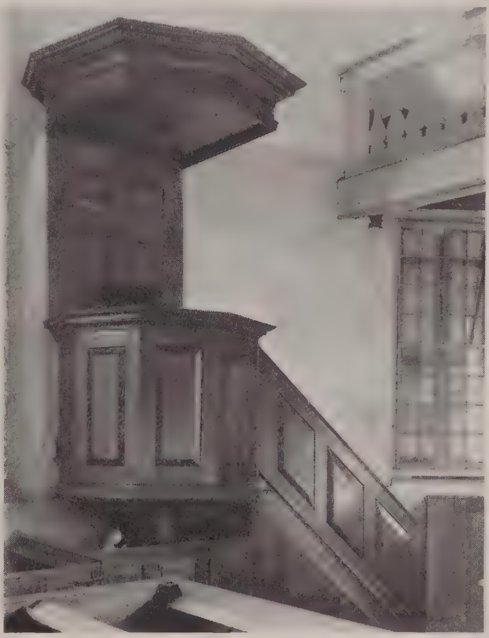


MEASURED AND DRAWN. JAN. 1929. Donald Millar.

AUGUSTUS LUTHERAN CHURCH, TRAPPE, PENNSYLVANIA, 1743.

On the second of May, 1743, the corner stone was laid. The Latin dedicatory inscription placed on the church wall may still be read: "Under the guidance of Christ, Heinrich Melchior Muehlenberg, together with the elders, J. N. Grosman, F. Marsteler, A. Heilman, H. Has and G. Kebner, upon this very ground erected this church dedicated to the denomination adhering to the Augsburg Confession." Within four months the congregation had moved from the barn and was worshiping in its own church, although the building was not finished,—indeed it was barely under roof. Two years later, in September, 1745, the church was finally completed and dedicated. Divine services were held henceforth regularly for over a hundred years. The passion for improvement which swept this country in the middle of the nineteenth century mercifully passed by Muehlenberg's old church, and it was left untouched. Instead of remodeling the building or tearing it down, the congregation, now grown rich, contented itself by building a "large and commodious" brick structure in the latest style, discarding the old church and preserving it for our delight and wonder.

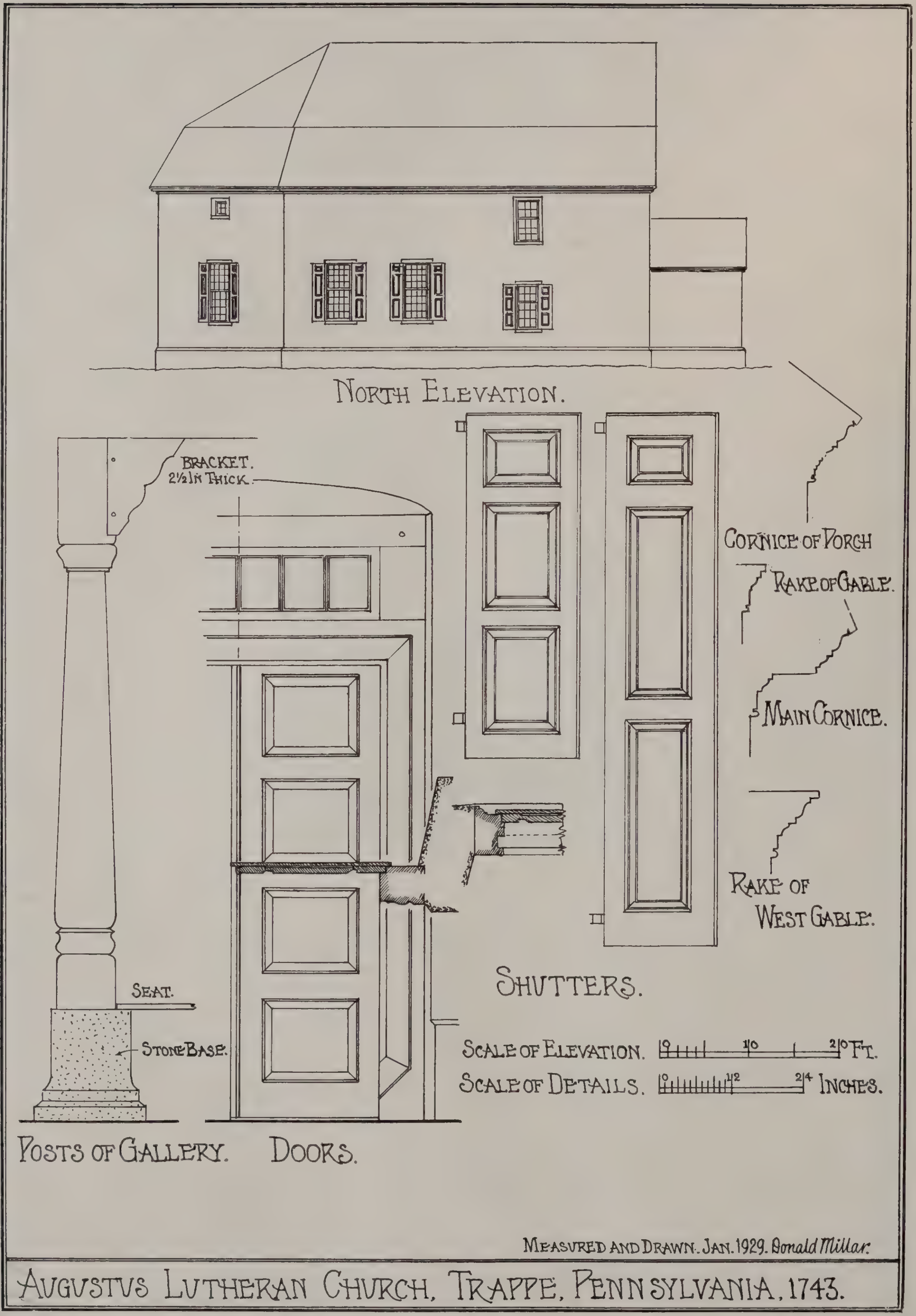
To enter Muehlenberg's church is to step back into the seventeenth century. The visitor finds himself in a square hall with galleries on three sides, supported by great oak posts resting on red sandstone blocks. The woodwork of the church is of a character that in England would be called Jacobean. Here may still be seen the heavy wood supports and gallery railings in vogue in the colonies a hundred years before the church was built, the high-backed box pews of oak and poplar, simply paneled and unpainted or unvarnished for two centuries, but gleaming from the touch of countless hands. A branding iron was used to mark the numbered place of each worshiper on the hymnbook holders secured to the backs of the pews. Locks and painted numerals on the doors set off the pews beneath the western gallery for the more prosperous. These doors have a tombstone-like form which corresponds closely to that of the fielded panels of the rooms from Millbach, Pennsylvania, 1752, belonging to the Pennsylvania Museum. The other pews were apparently open at first, with curved ends, still to be seen in one or two instances. At a later time many more were closed by paneled doors of pine. The butt hinges as well as the paneling of these doors indicate the later date. These contrast sharply with the richly carved strap hinges of the oldest pew doors, which are beautiful examples of the work of the early Pennsylvania smith, possessing the rich simplicity of the period.


Old Pulpit

As was usual, the sexes were separated, the women sitting on the northwest side, the men opposite, the pews under the organ being reserved for the elders of the church. Servants and boys were obliged to climb the winding stairs to the rigid benches in the gallery, much like rough modern "bleachers," where they worshiped under the supervision of the sexton! The northeast gallery, with its pierced balustrade of blue and white, was added to the church in 1751 to contain the new organ that had recently been imported from Europe. Muehlenberg's congregation was one of the first in rural Pennsylvania to purchase an organ. To protect it and the singers from intrusion there was erected a fence of palings, likewise cut in curved outline, and decorated in the favored blue and white. The marbling of the same colors on the columns we know to have been done in 1814. Such decorative painting was not unknown even in the English colonies along the Atlantic seaboard.

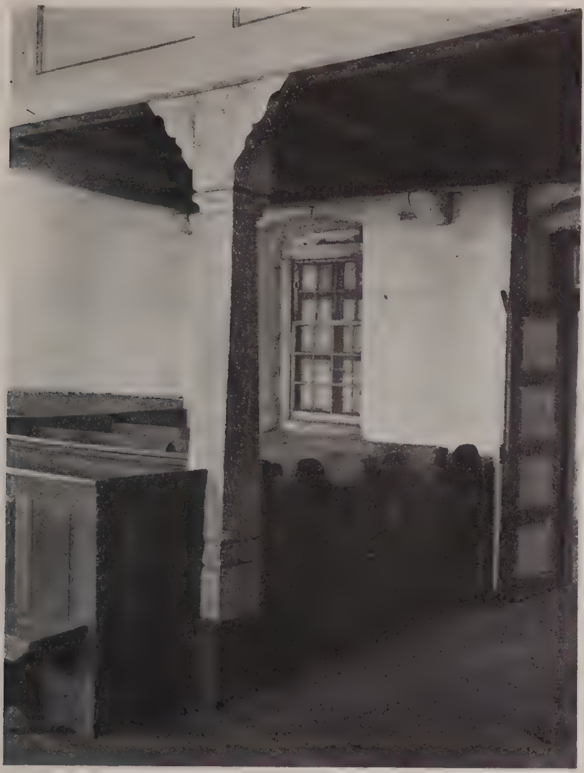
To conform to the ritual of the Lutheran Church, the sanctuary, at one end of the building, is an octagonal apse. The white painted altar was placed in the open space before the high pulpit, resting on a great hexagonal post from which extend brackets sawn to shape. In sharp contrast to this, which, like the other original features of the church, preserves mediæval characteristics, is the pulpit itself, of paneled walnut. Here more than anywhere else in the building we see the typical Georgian characteristics of the eighteenth century, though, to be sure, in a simple form. Here only do we find classic mouldings and, on the sounding board above, a classic cornice, all of which is decidedly architectural.

Certain changes have been made in the building in the course of time, but none have been of great consequence. The sash seem to have been replaced around 1800, the original sash presum-

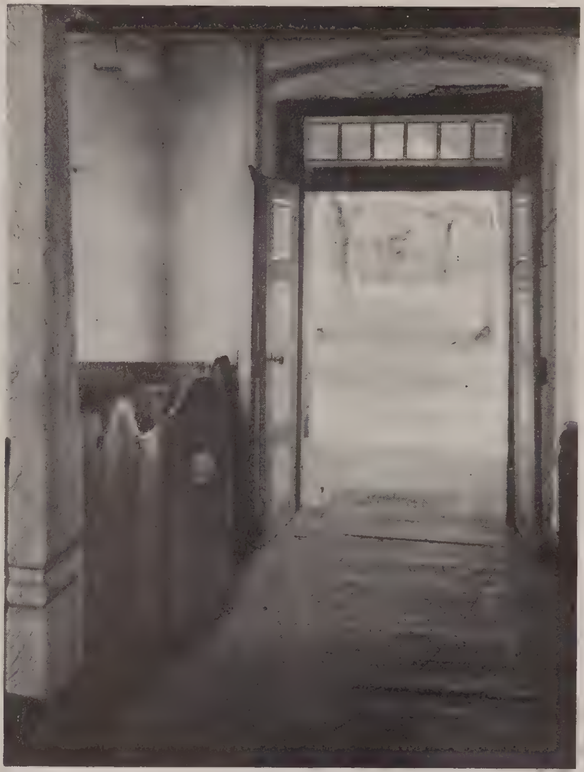


MEASURED AND DRAWN. JAN. 1929. Donald Millar.

AUGUSTUS LUTHERAN CHURCH, TRAPPE, PENNSYLVANIA, 1743.



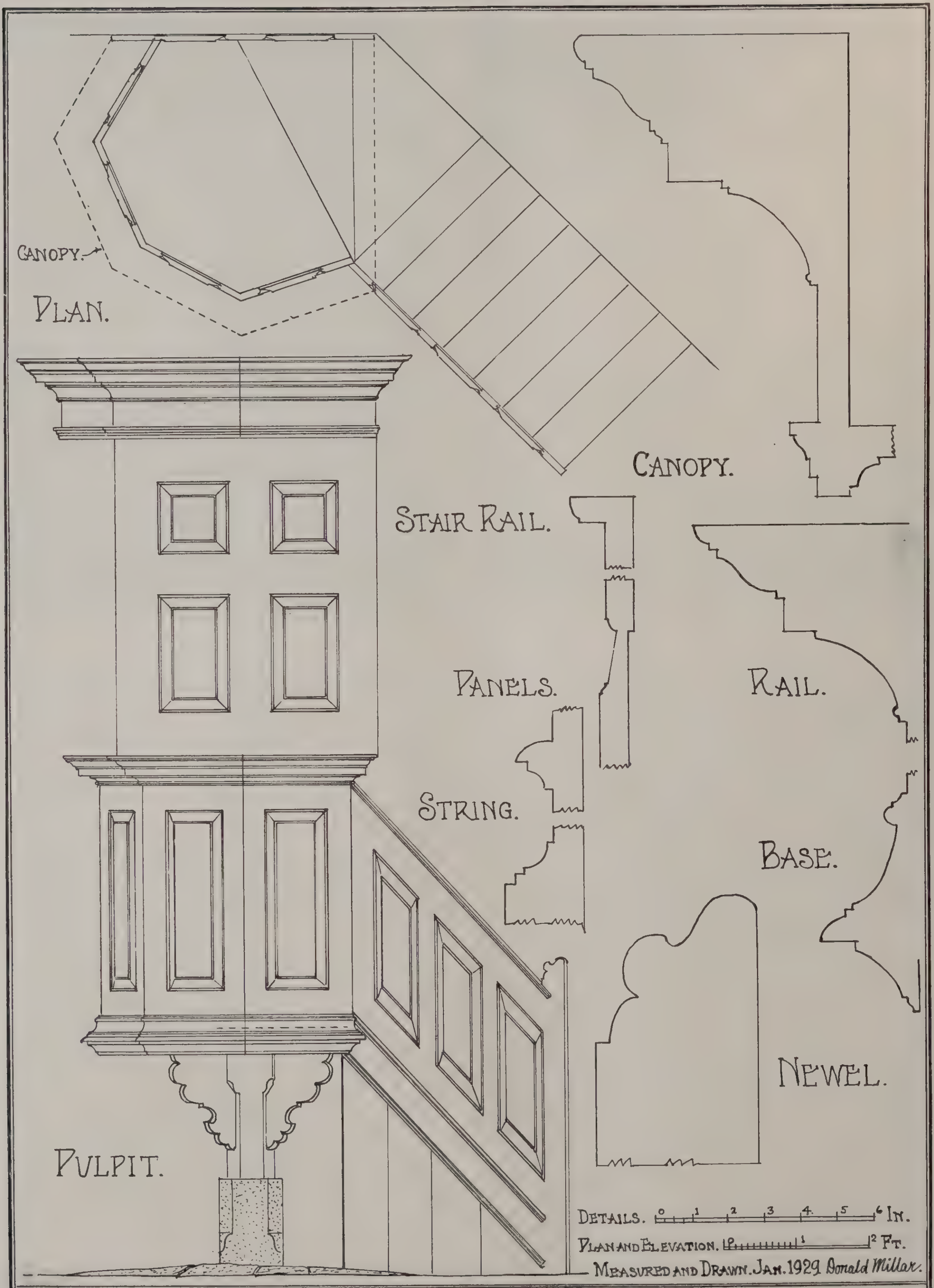
The Marbled Columns



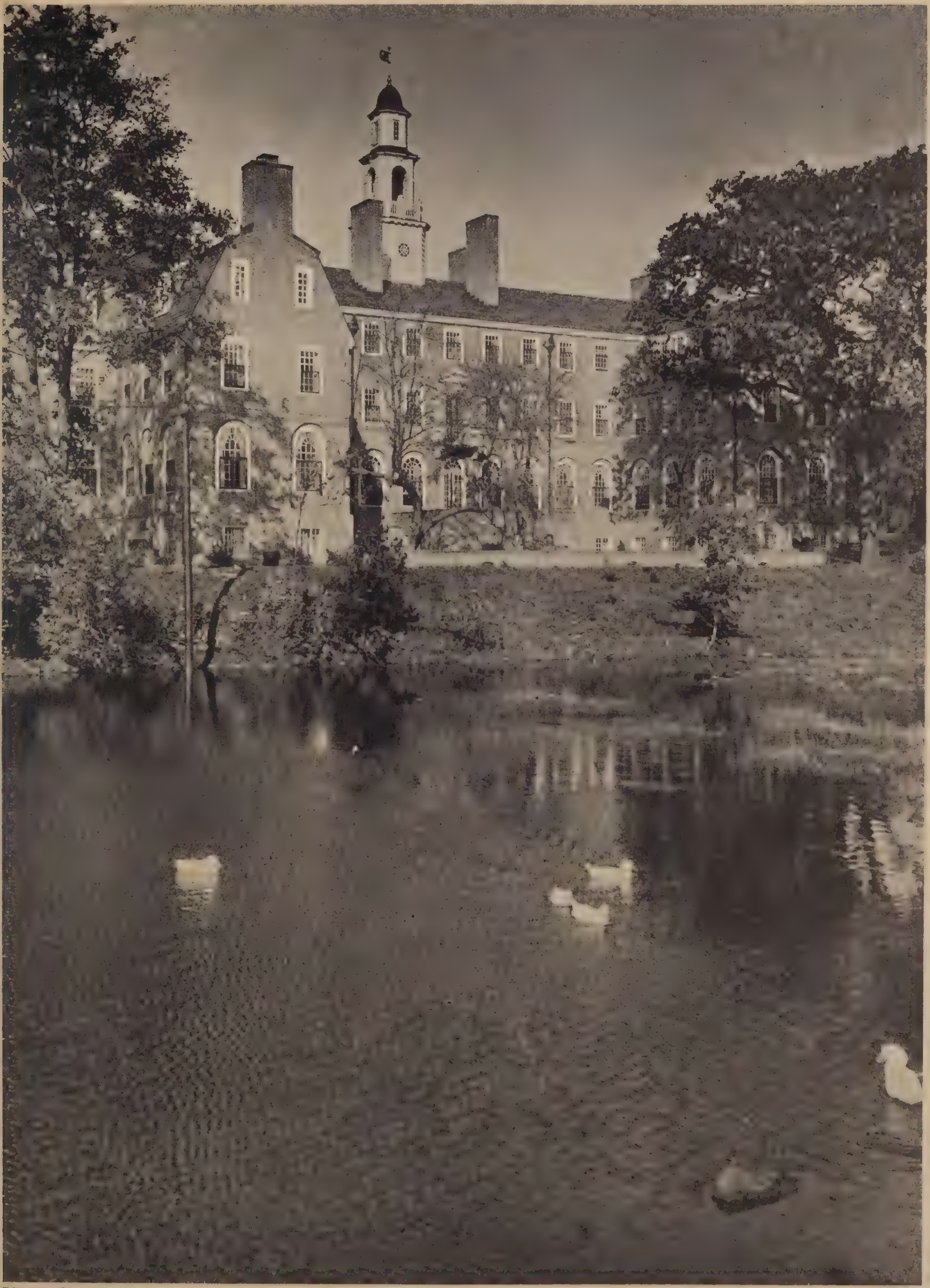
The Oldest Pews

ably having had the same heavy bars that we still see in the transom over the doorway. The floor, originally of irregular blocks of sandstone, has long since been supplanted by a floor of wood. For many years the sexton spread straw on the floor of the pews, and the women brought hot bricks to fight the cold. Some 70 years after the building of the church the conservative congregation at last invested in a stove! To the rear of the church lies the old burying ground, its ancient gray tombstones rudely carved with those emblems characteristic of every form of artistic endeavor undertaken by the Pennsylvania Germans. Many of the graves are unmarked, and numerous inscriptions have been effaced by time. Some of the stones lie half buried in the earth, but enough remain in the oldest part to show that the graves of those first buried there faced the fatherland that lay in the distant East. Although this section of the country was settled shortly after 1683, and the cemetery may well have been used not long thereafter, the earliest legible epitaph is dated much later. It reads: "Here Lyeth the Body of Hannah Schrack. Was Born April 17 1722. Died September 9 1736."

The Old Trappe Church played its part in the Revolutionary War, although it was left unharmed by the marching feet of the rival soldiers who passed through it from time to time. During the early days of the war the church was used to house outposts of the colonial militia. A few days after the battle of Brandywine, in 1777, General Washington crossed the Schuylkill and marched toward Trappe, leaving the British encamped on the opposite side of the river. The window is still pointed out from which the anxious Muehlenberg watched the enemy through a telescope. A week later they arrived. The soldiers were quartered in the pastor's barn, where they promptly destroyed the hay, and then overran the church. Stacking their arms in a corner they amused themselves playing the organ and singing. Meanwhile the genial pastor played host to Lord Sterling and General Wayne in the parsonage. Subsequently the church was transformed into a hospital. It was used in this capacity until the army went into winter quarters at Valley Forge, when it was once more given over to divine services. Henceforth they were held regularly until 1851. Even now, however, the old church is not wholly abandoned. Once a year, on a Sunday in June, the congregation gathers from far and near to pay homage to Muehlenberg and old memories. It would be difficult to find anywhere in America a building so characteristic of its time. It stands at the end of an avenue of old trees and surveys the changing world of today just as it has seen the passing of several generations during almost two centuries. The old church has been fortunate indeed in escaping the "improvement" which has worked such devastation elsewhere and ruined many an old church.


CANOPY.
PLAN.
CANOPY.
STAIR RAIL.
PANELS.
RAIL.
STRING.
BASE.
NEWEL.
PULPIT.
DETAILS. 0 1 2 3 4 5 6 IN.
PLAN AND ELEVATION. 0 1 2 FT.
MEASURED AND DRAWN. JAN. 1929. Donald Millar.

AUGUSTUS LUTHERAN CHURCH, TRAPPE, PENNSYLVANIA. 1743.



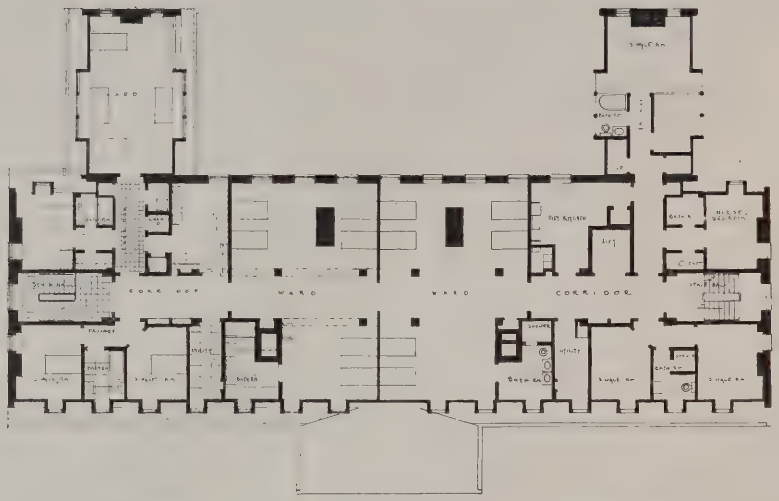
Photos. Sigurd Fischer

Plans on Back

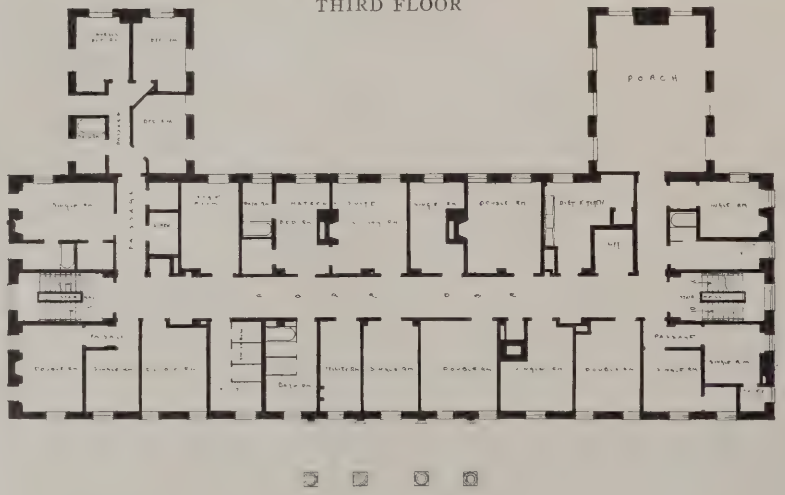
VIEW ACROSS WATER

INFIRMARY, CHOATE SCHOOL, WALLINGFORD, CONN.

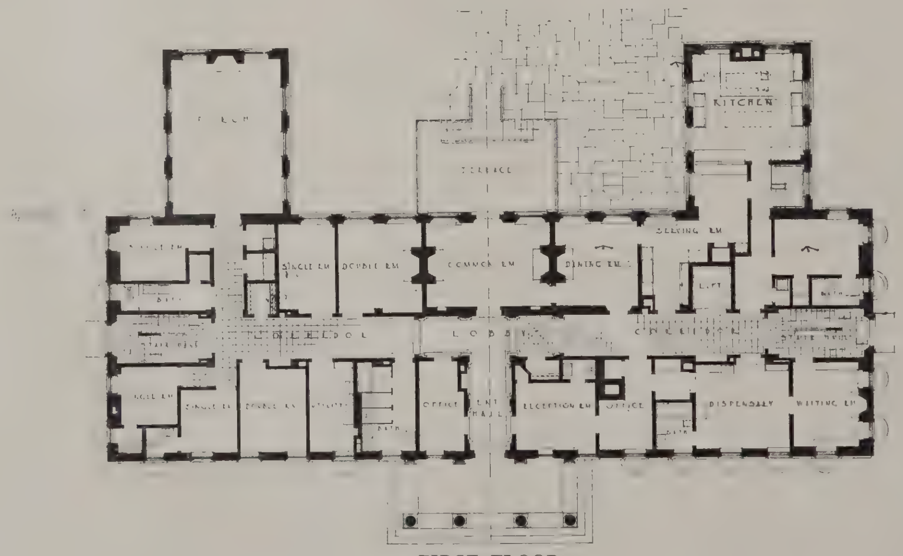
CRAM & FERGUSON, ARCHITECTS



THIRD FLOOR

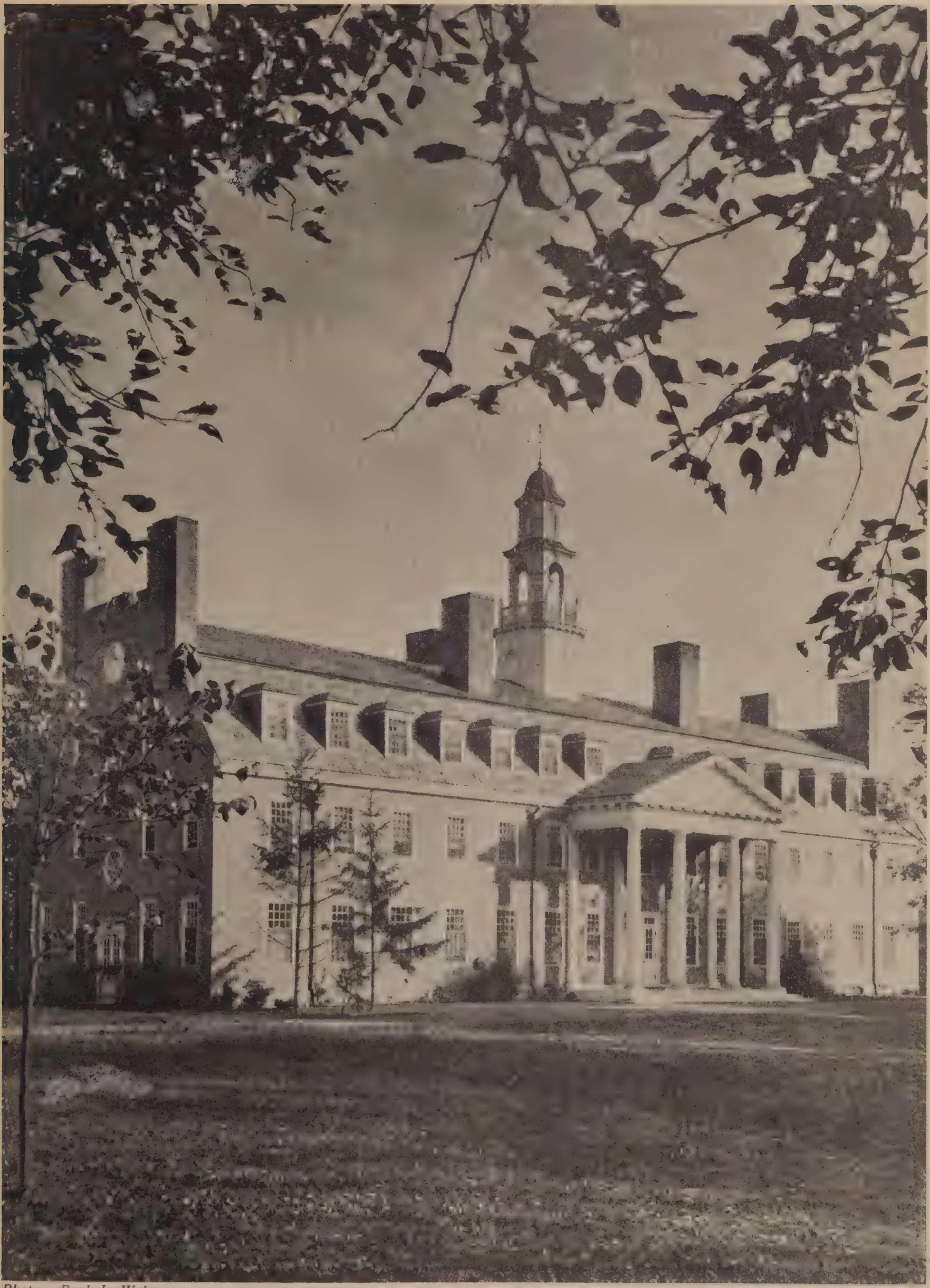


SECOND FLOOR



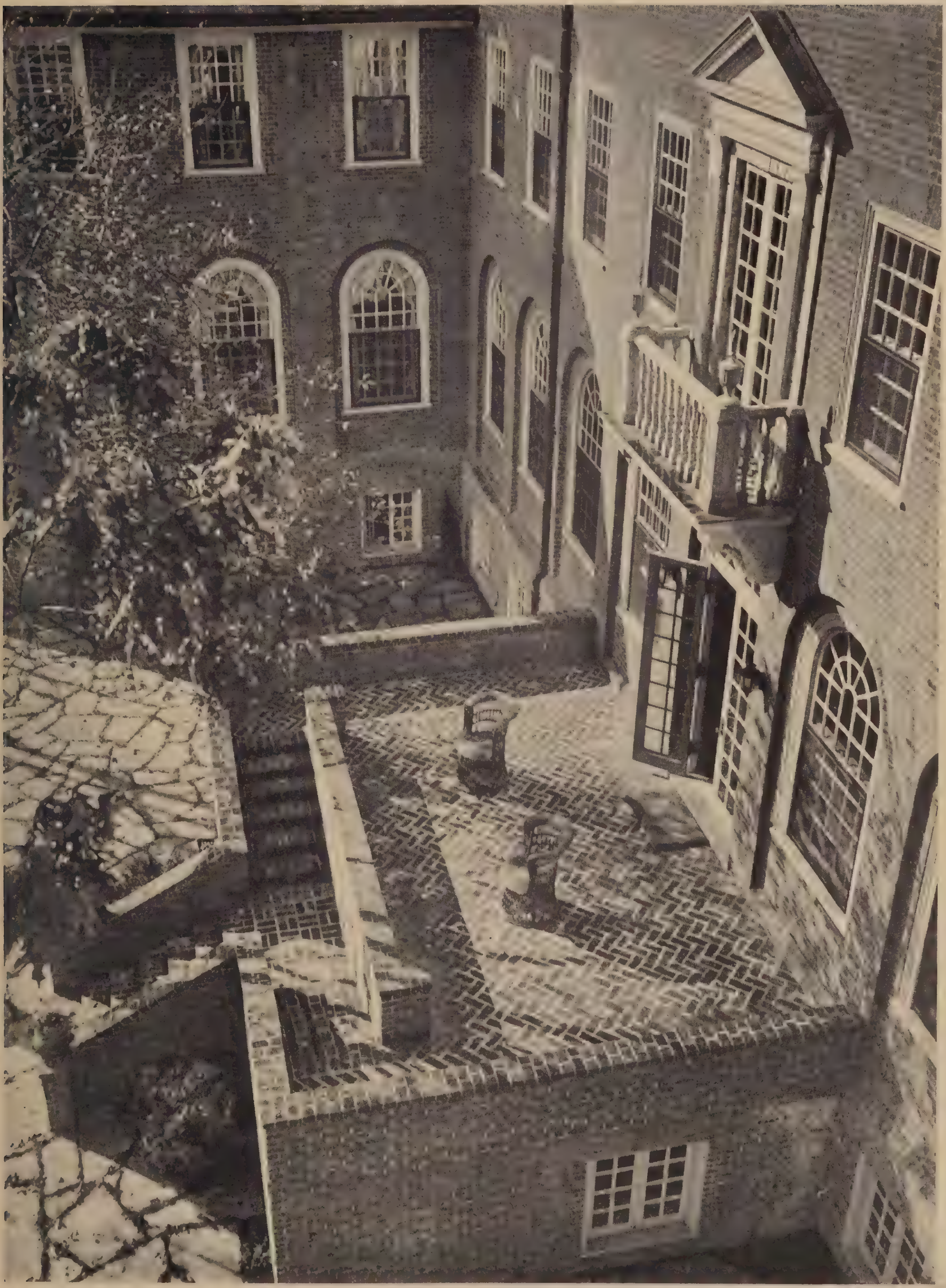
FIRST FLOOR

PLANS. INFIRMARY, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS

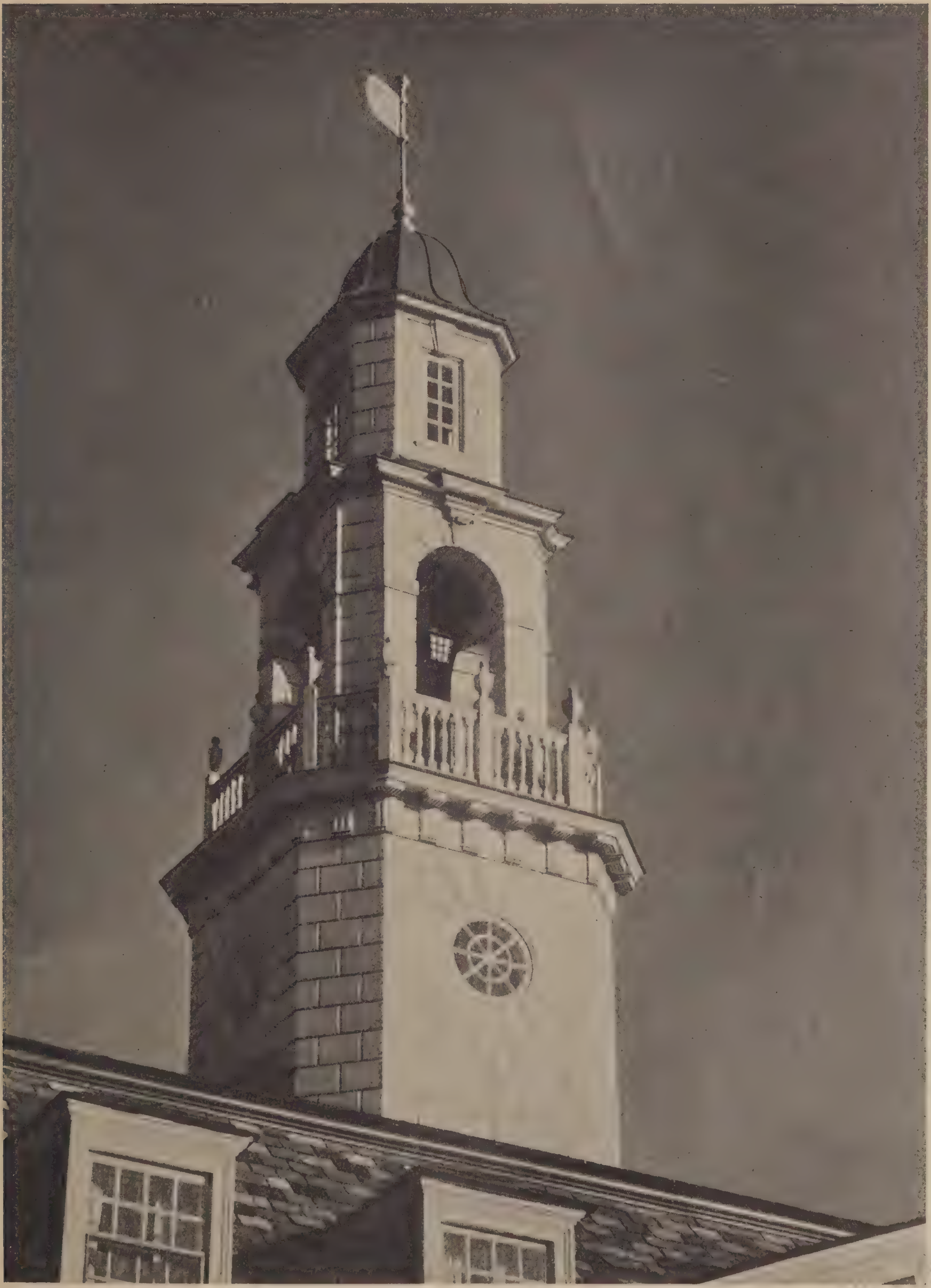


Photos. Paul J. Weber

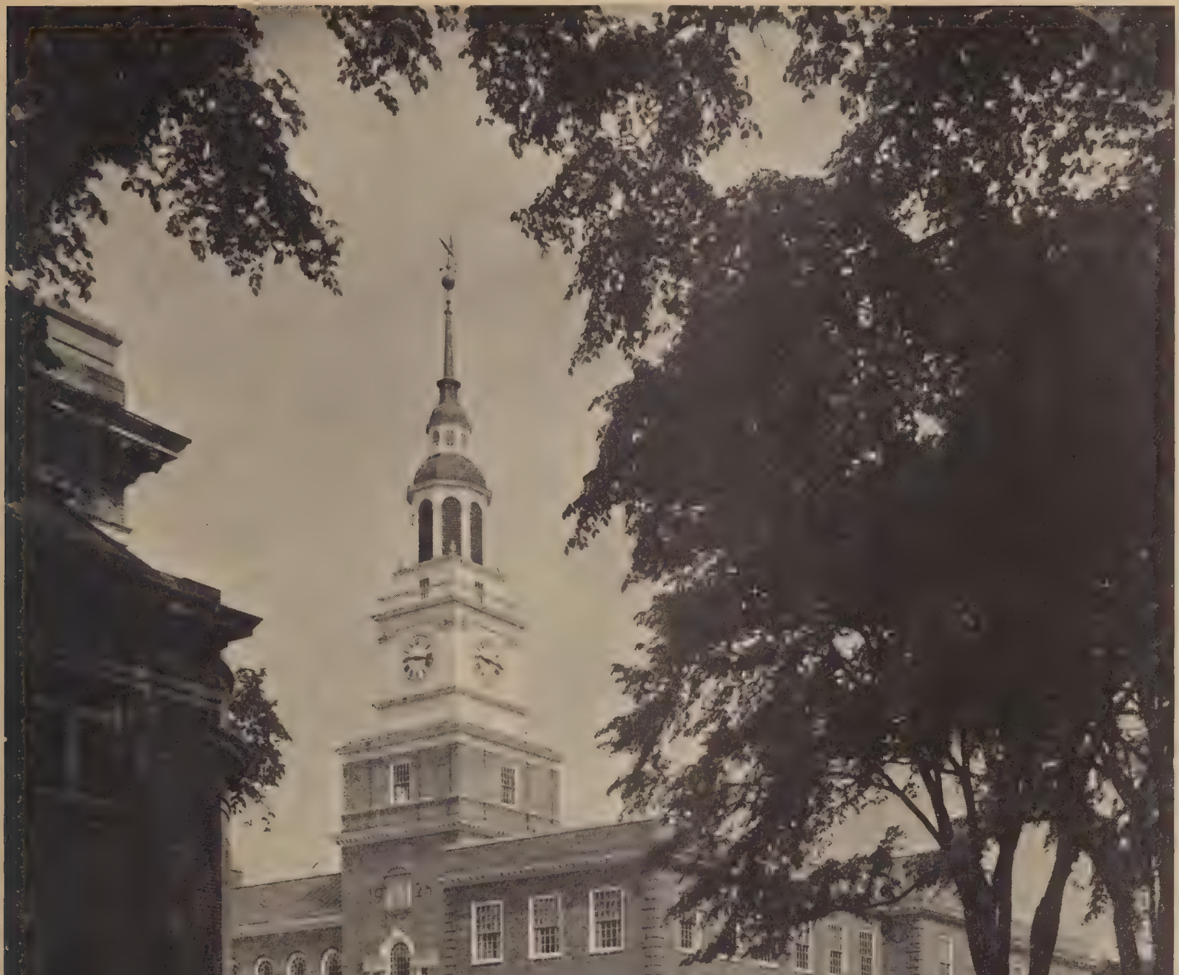
GENERAL VIEW
INFIRMARY, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS



THE BRICK TERRACE
INFIRMARY, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS



THE CUPOLA
INFIRMARY, CHOATE SCHOOL, WALLINGFORD, CONN.
CRAM & FERGUSON, ARCHITECTS



Photos. Paul J. Weber GENERAL VIEW Plan on Back

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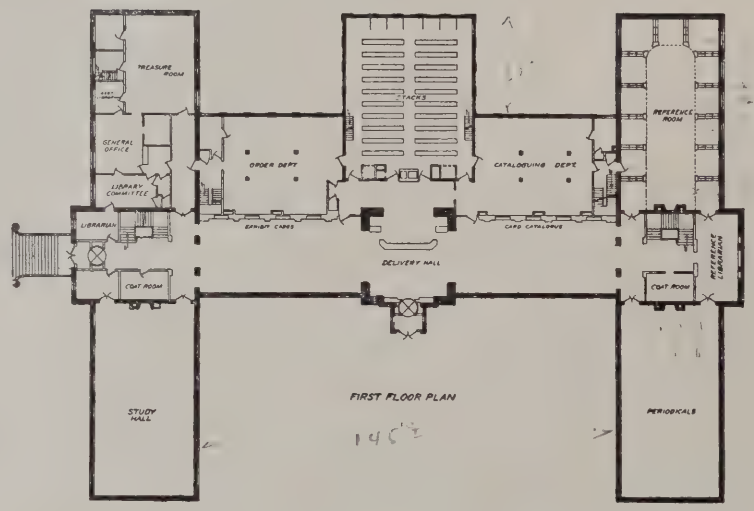
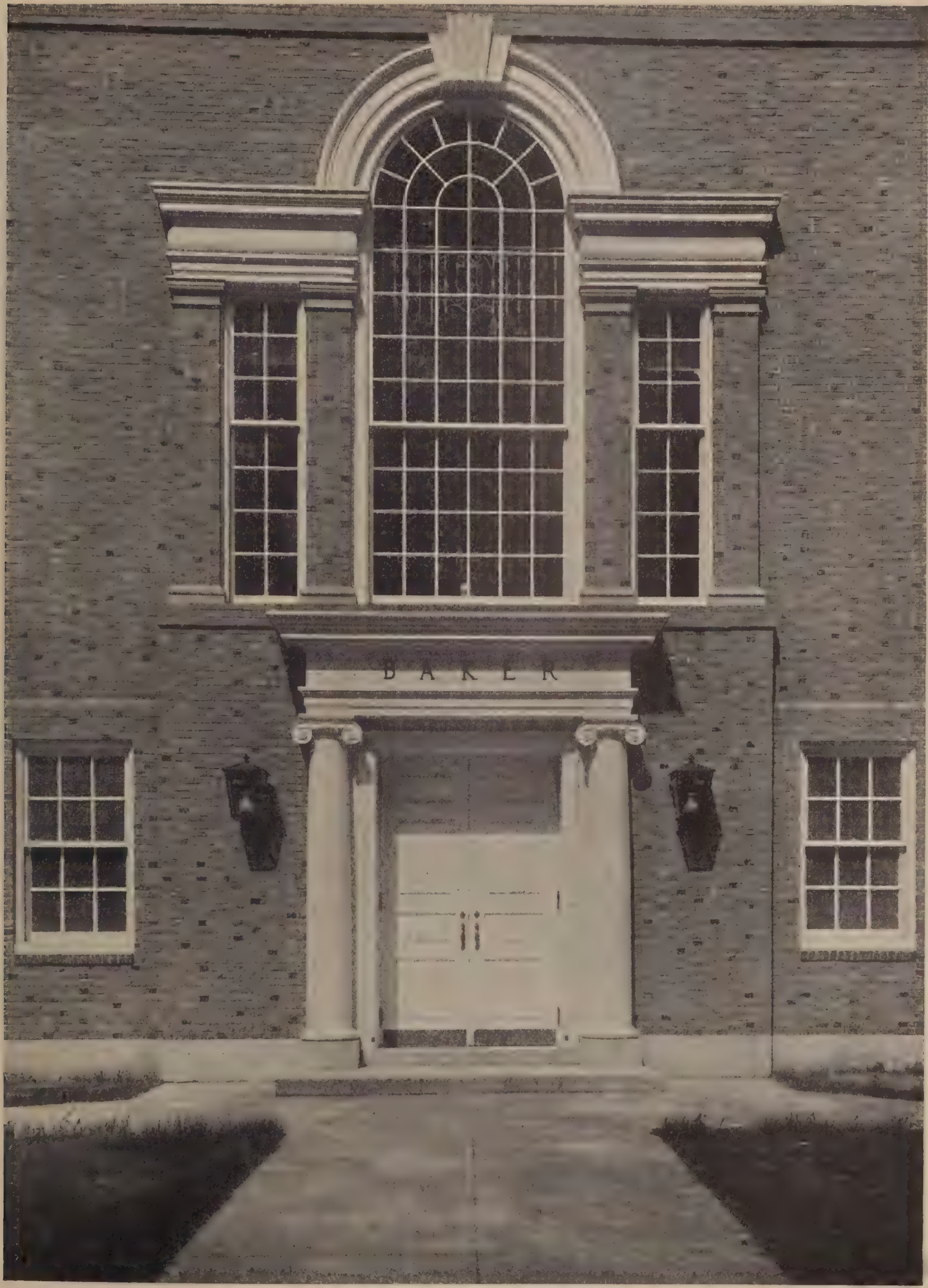
JENS FREDRICK LARSON, ARCHITECT



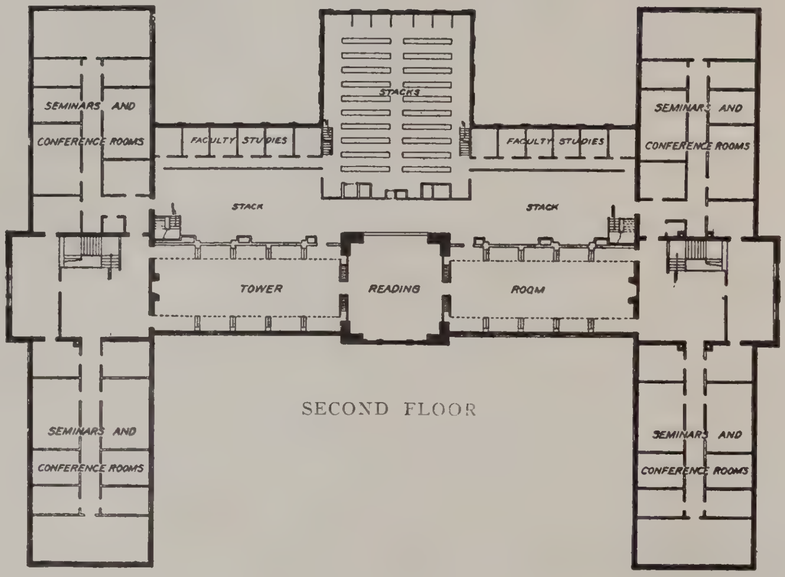
PLAN. BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT

BOSTO PUBLI LIBRAR

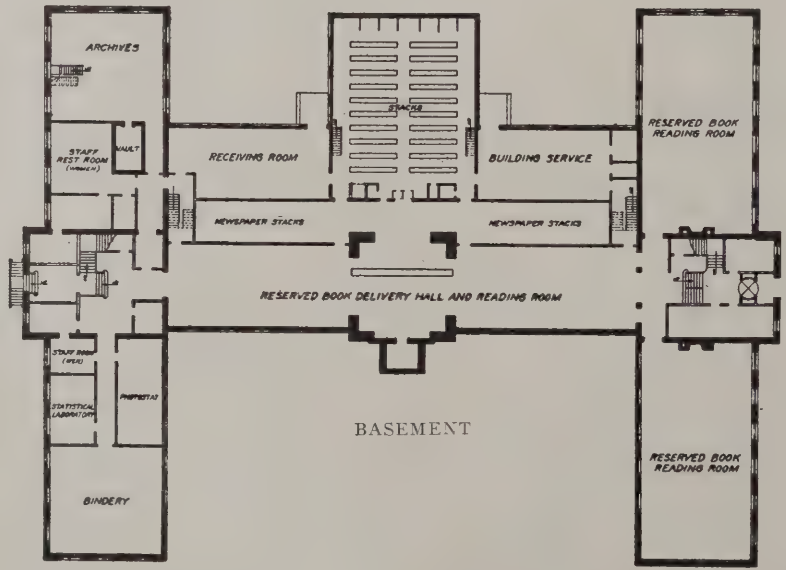


Plans on Back

EAST ENTRANCE
BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT


SEMINARS AND CONFERENCE ROOMS
FACULTY STUDIES
STACKS
FACULTY STUDIES
SEMINARS AND CONFERENCE ROOMS
STACK
STACK
TOWER
READING
ROOM
SEMINARS AND CONFERENCE ROOMS
SEMINARS AND CONFERENCE ROOMS

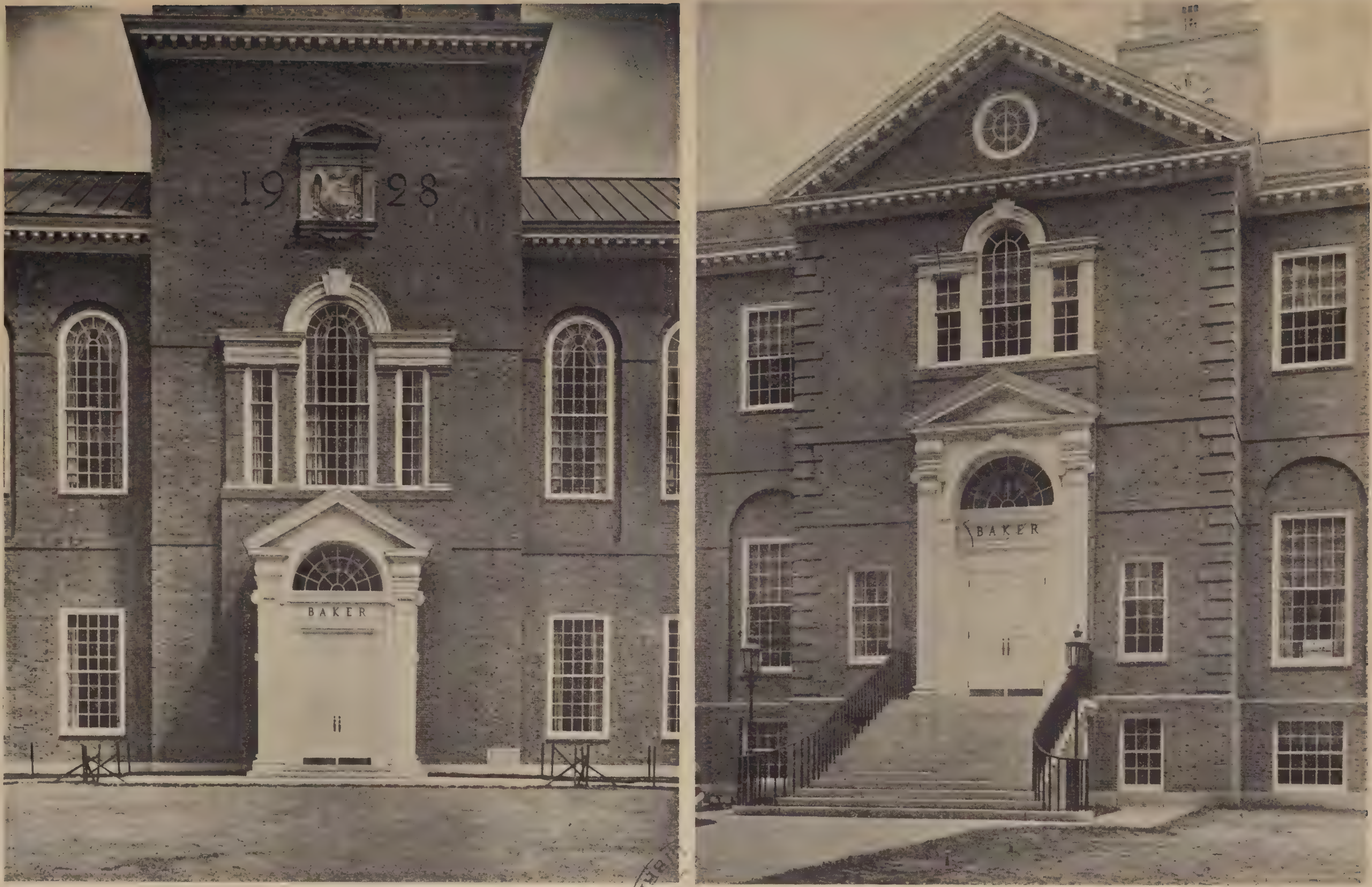
SECOND FLOOR



BASEMENT

PLANS. BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT

BOSTON PUBLIC LIBRARY



SOUTH ENTRANCE

WEST ENTRANCE

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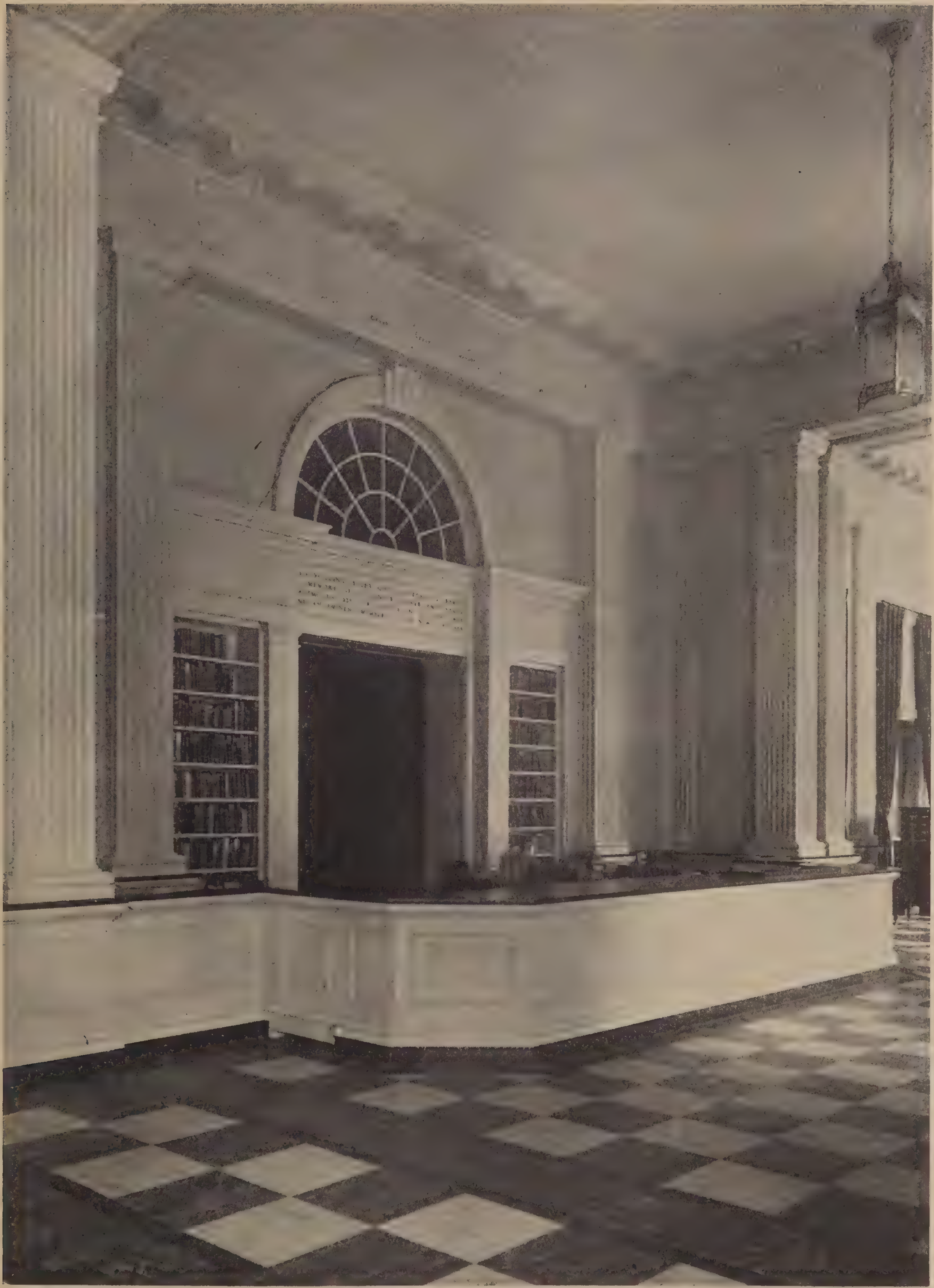
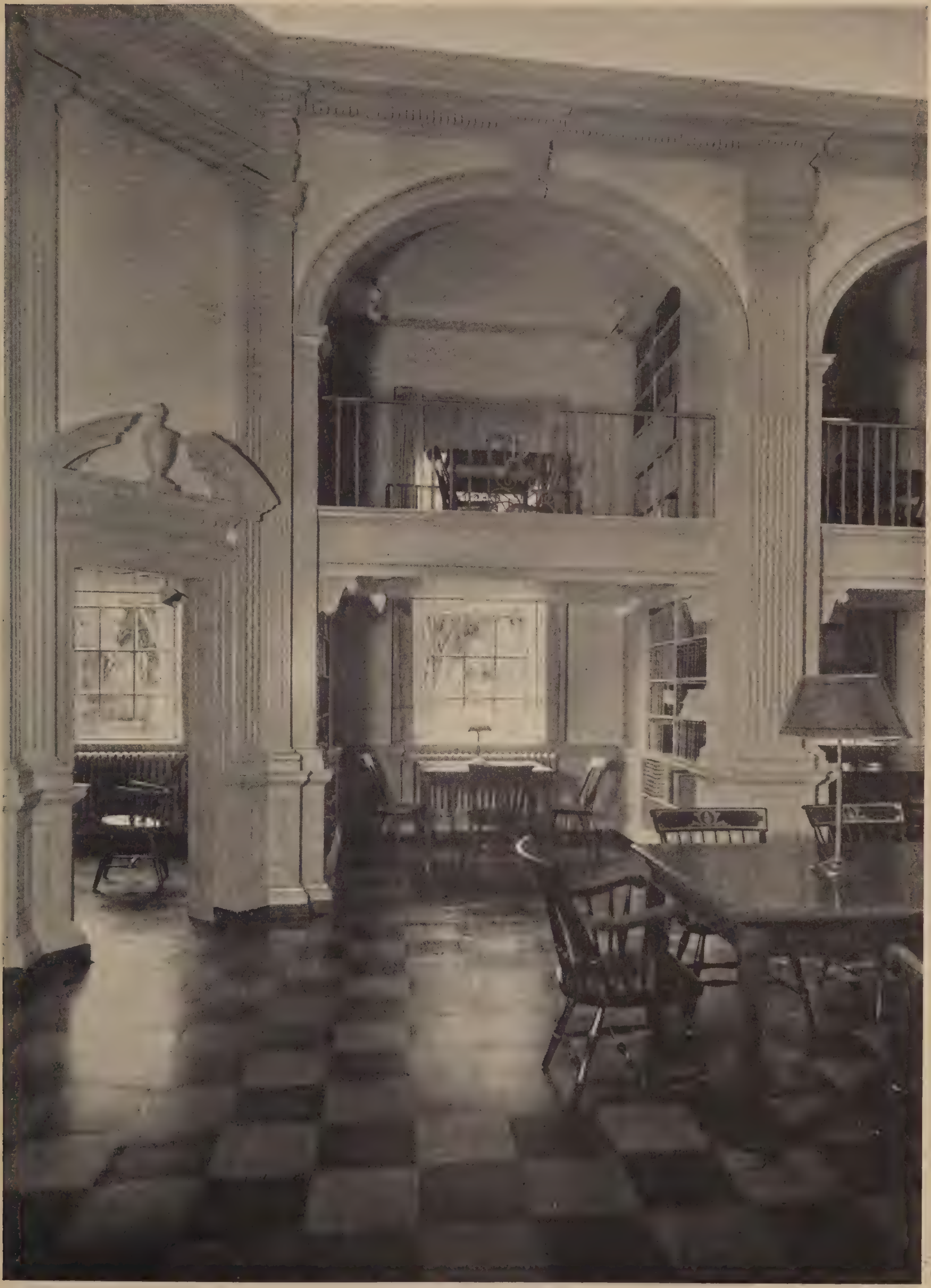
JENS FREDRICK LARSON, ARCHITECT



MAIN DELIVERY DESK

BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.

JENS FREDRICK LARSON, ARCHITECT



REFERENCE ROOM
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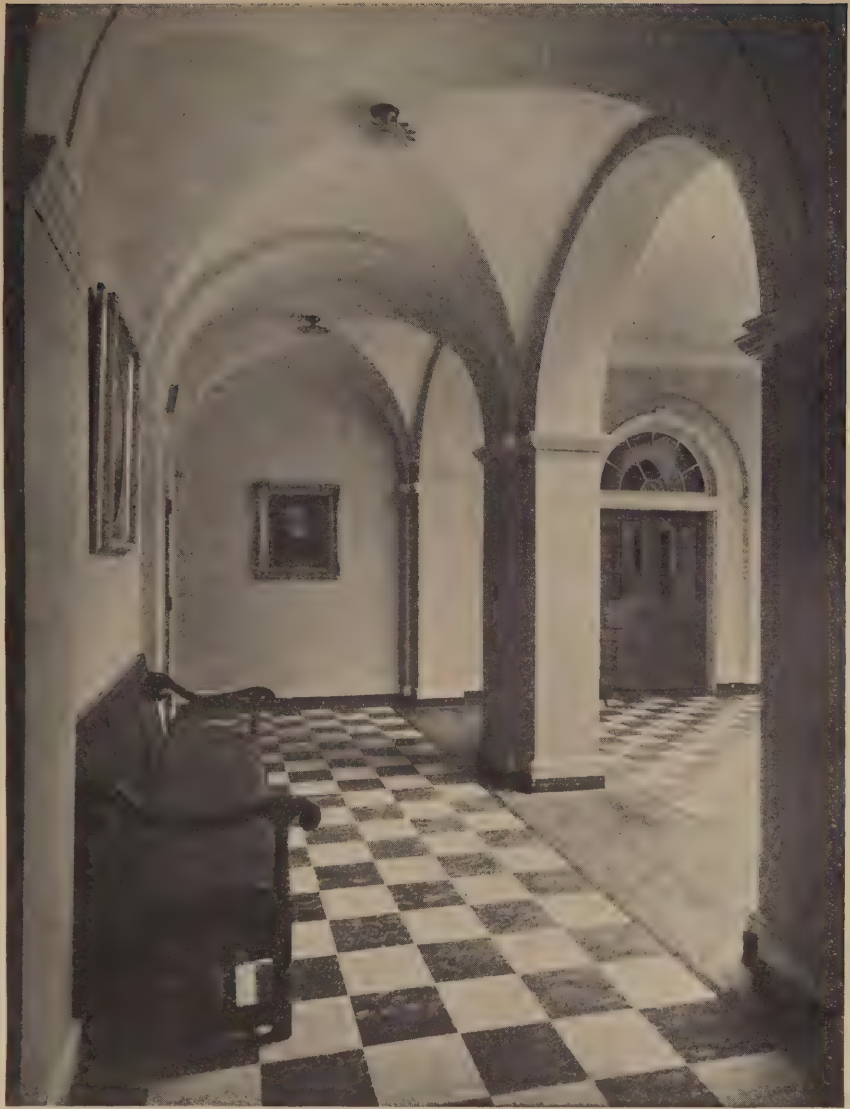
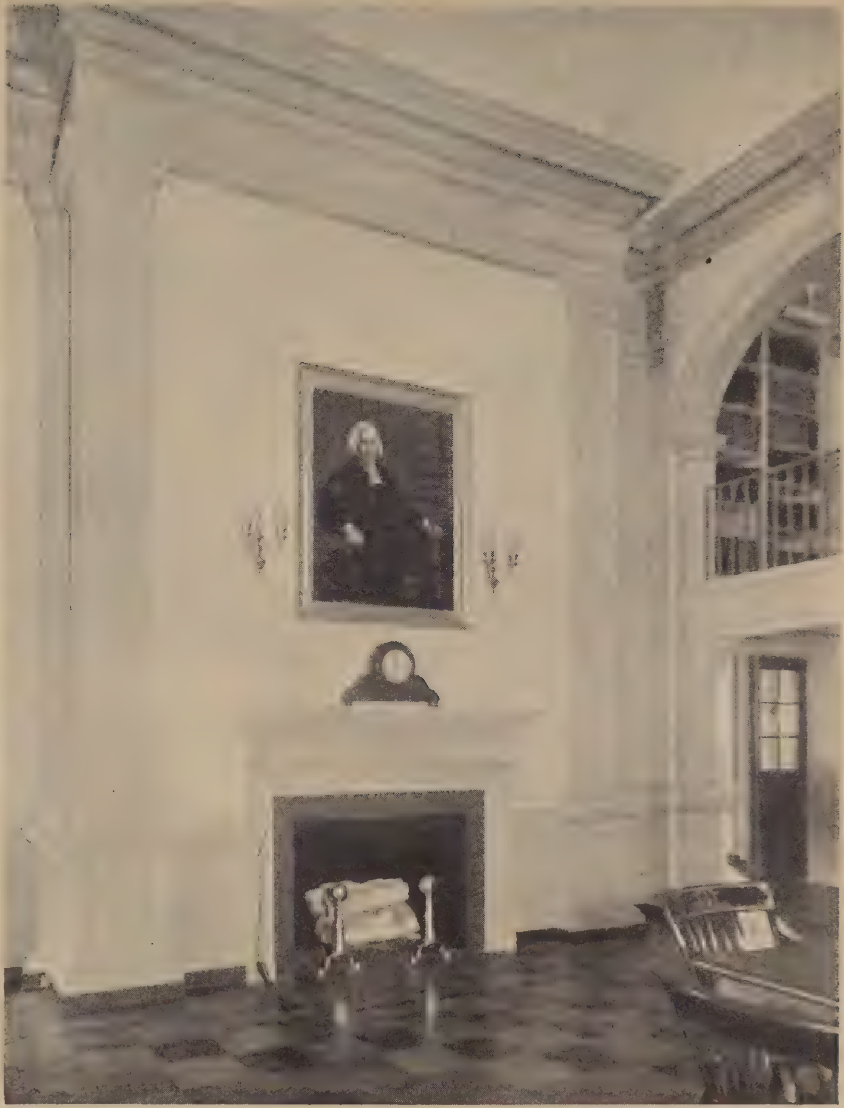
JENS FREDRICK LARSON, ARCHITECT



SECOND FLOOR HALL



FIREPLACE, REFERENCE ROOM

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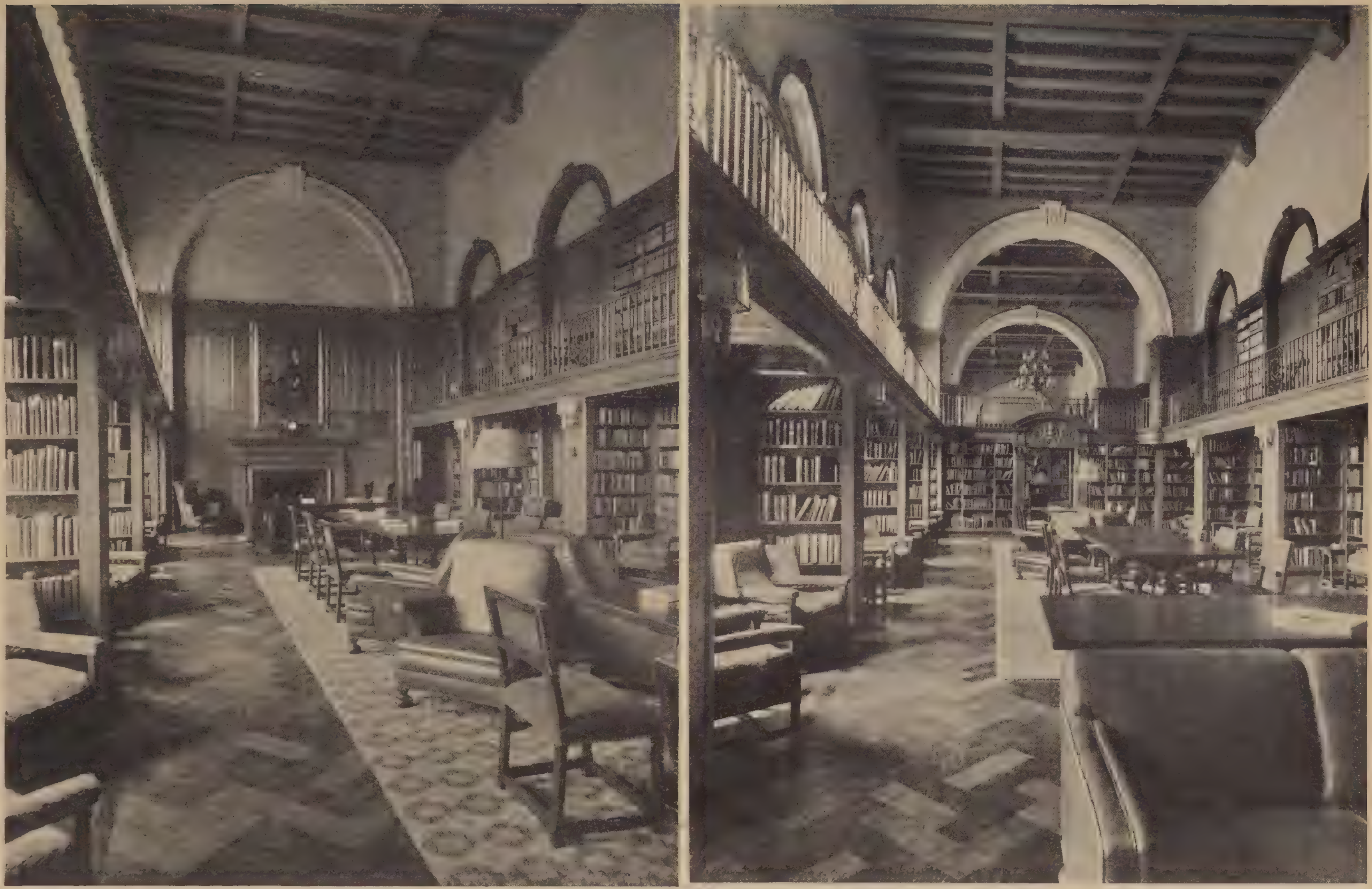
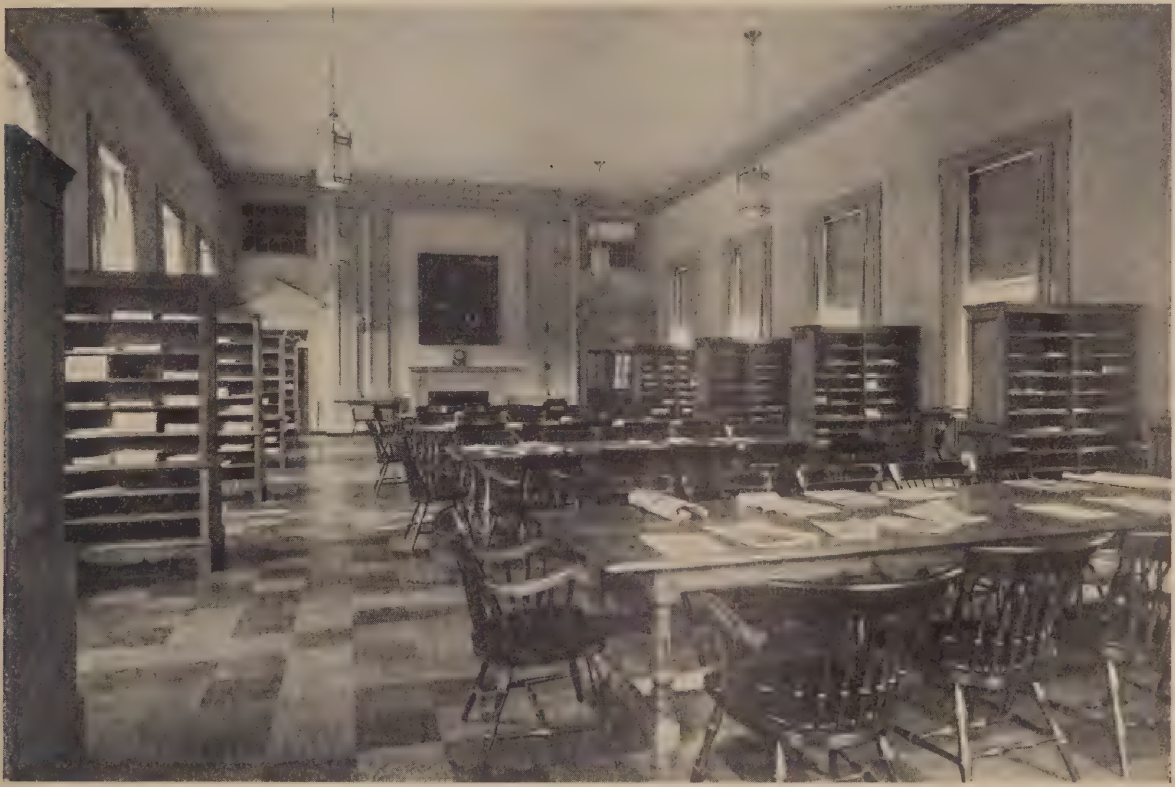
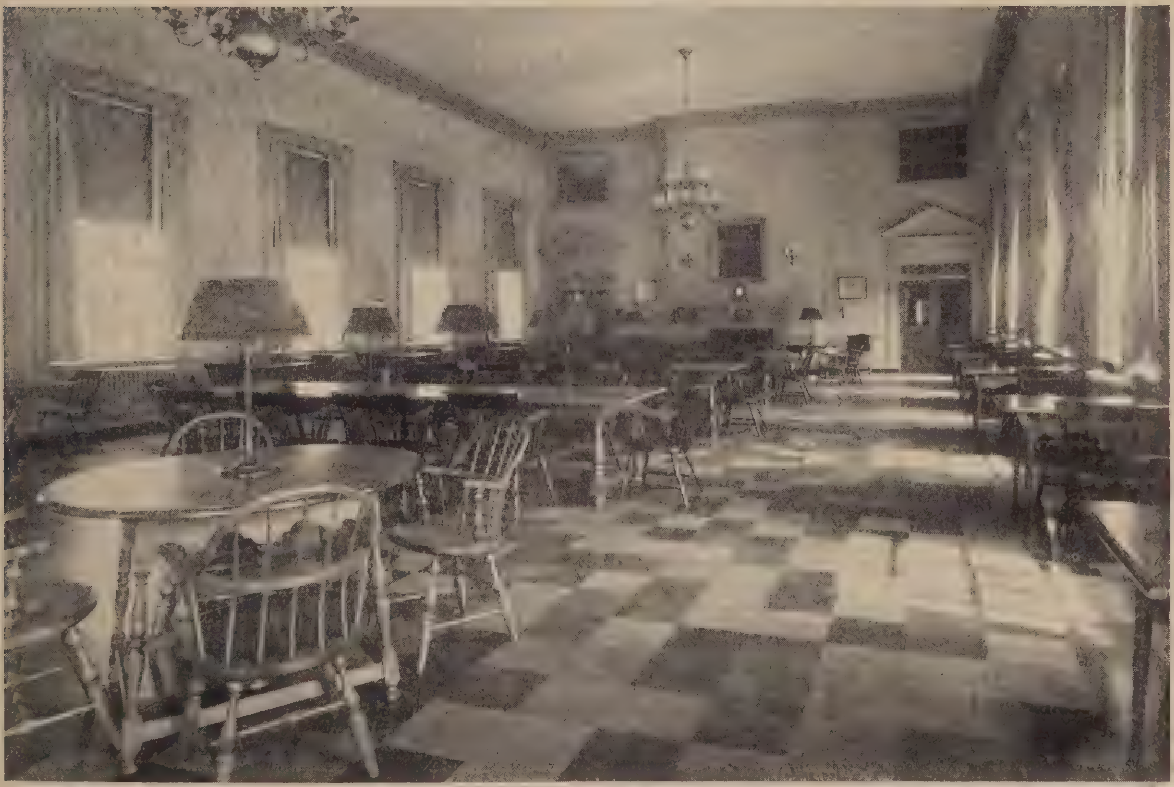
JENS FREDRICK LARSON, ARCHITECT



TWO VIEWS OF THE TOWER READING ROOM
BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT



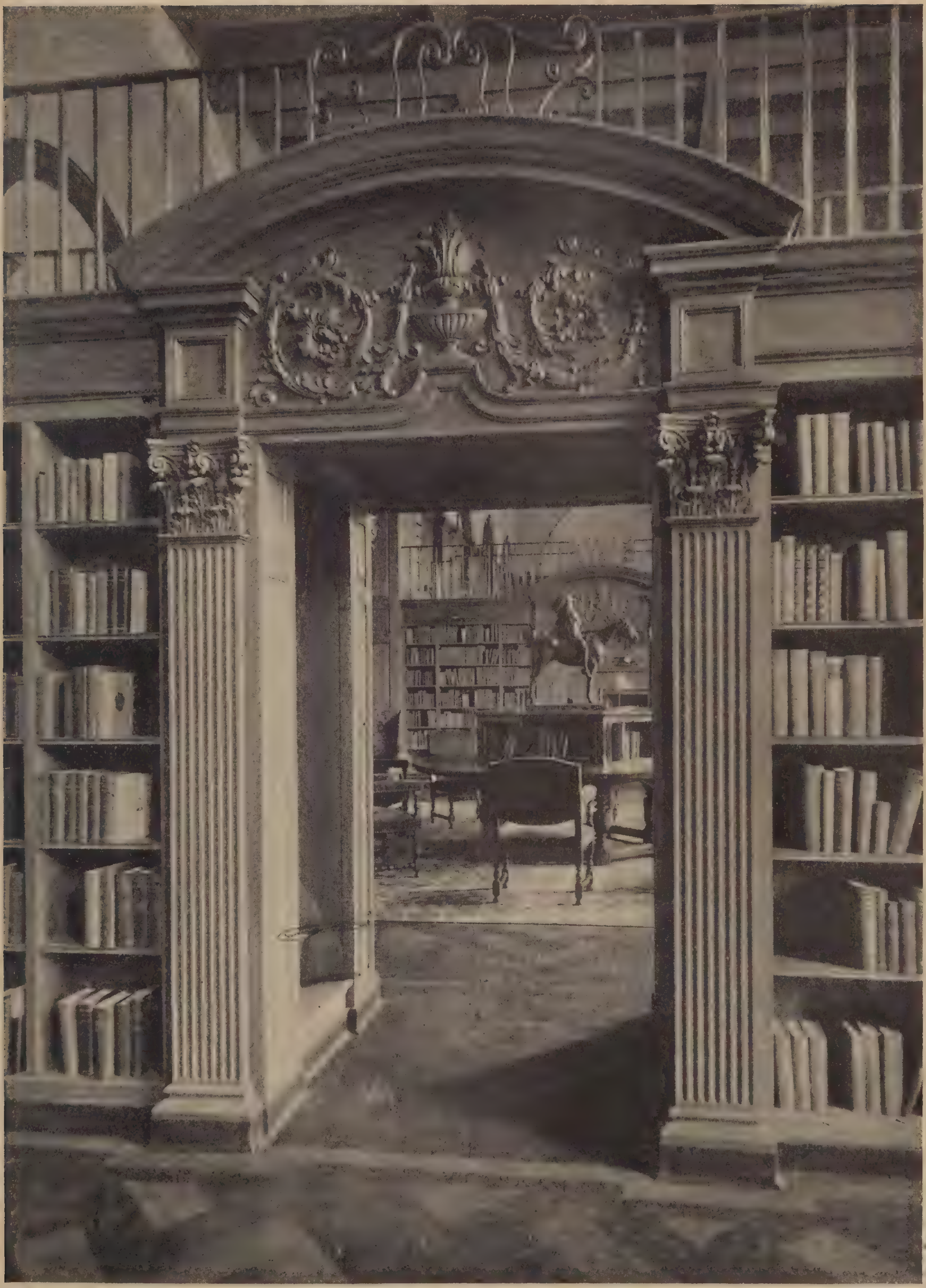
PERIODICAL ROOM



STUDY ROOM

BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.

JENS FREDRICK LARSON, ARCHITECT



CENTRAL SCREEN, TOWER READING ROOM
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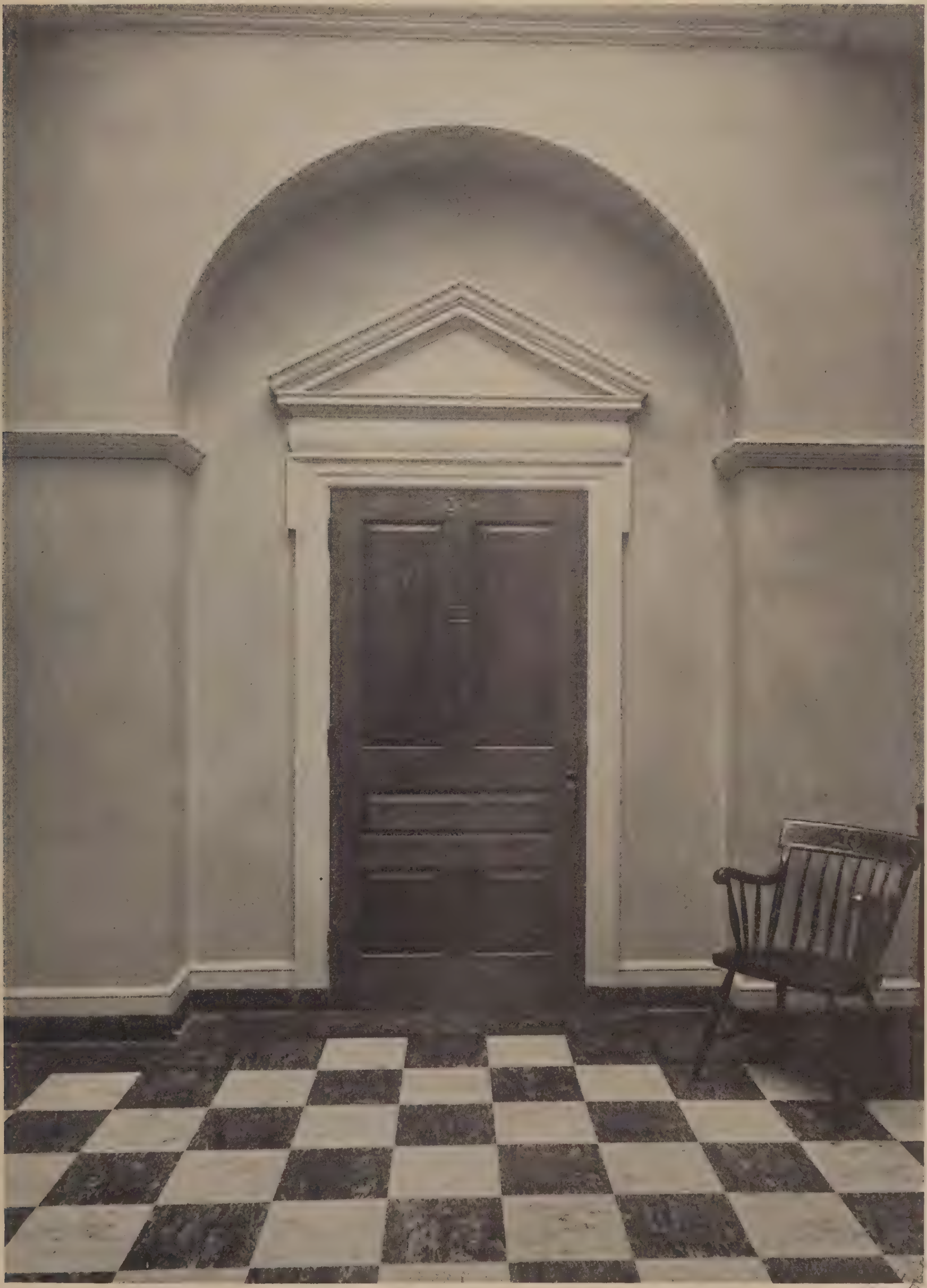
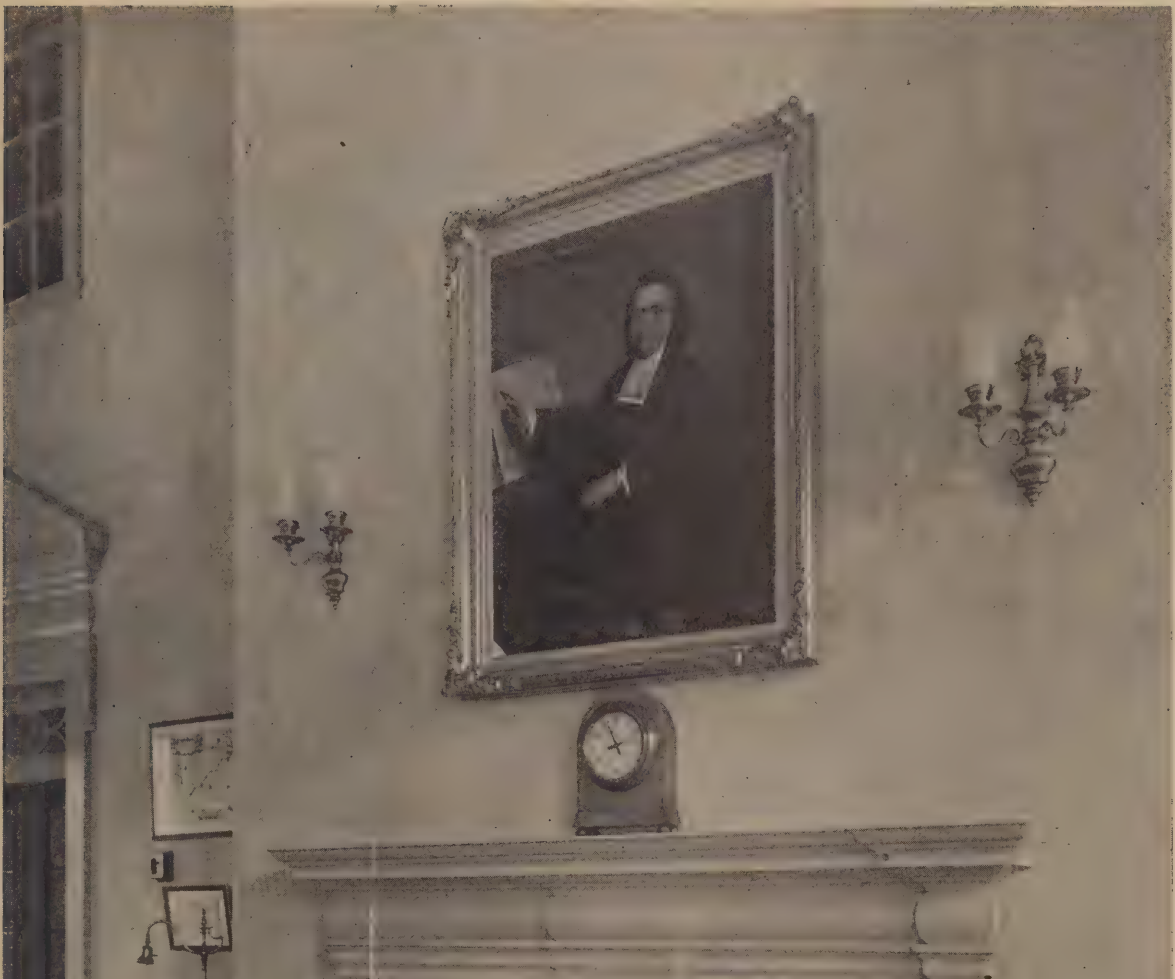
JENS FREDRICK LARSON, ARCHITECT

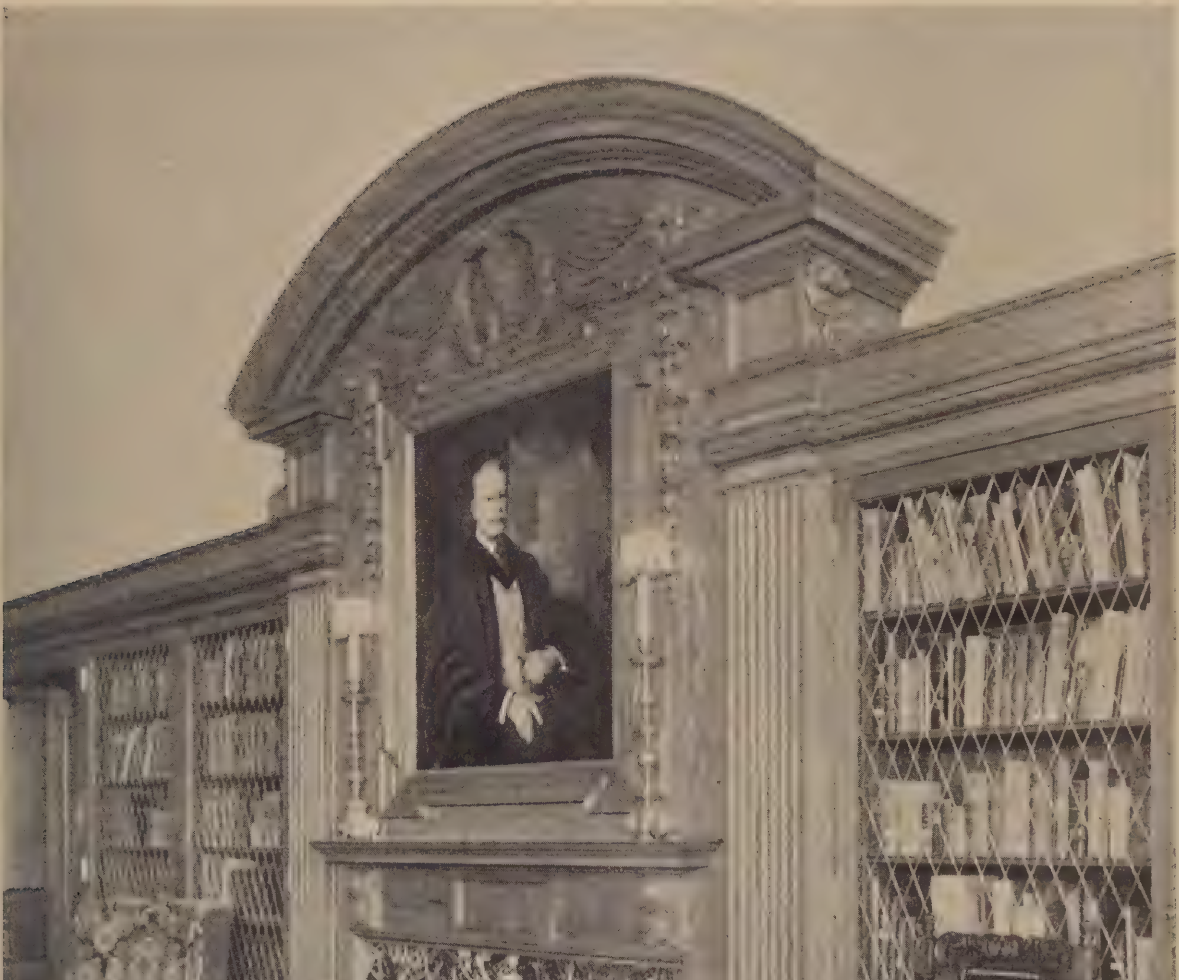
BOSTON PUBLIC LIBRARY



DOOR TO SEMINAR ROOM, SECOND FLOOR
BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT



FIREPLACE IN STUDY ROOM
BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT



TREASURE ROOM
BAKER MEMORIAL LIBRARY, DARTMOUTH COLLEGE, HANOVER, N. H.
JENS FREDRICK LARSON, ARCHITECT

BAKER MEMORIAL LIBRARY AT DARTMOUTH COLLEGE

BY

JENS FREDRICK LARSON

ARCHITECT

DARTMOUTH COLLEGE endeavors to enable men to train themselves for constructive action guided and energized by logical and imaginative thought based on wide and accurate knowledge. The source of this knowledge is to be found in the fund of human experience preserved for the most part in printed or manuscript records. The primary function of a library, therefore, should be to make these records available as a central feature in the intellectual life of a college. This is the principle which here dominated the work of the committee and the architect in the development of the plans, but use of the records of human experience cannot be in the fullest sense effective unless it is accompanied by the stimulus to achievement derived from appreciative contemplation of the contributions to truth and beauty embodied in the recorded experience of the race.

The purpose of library planning, therefore, is to provide for the use of books and the enjoyment of books. This can be accomplished only by realizing and dividing into four major units the problem as a whole:

1. The storage and service necessary to take care of the book collection, which would include the accession, cataloguing, storage and lending of books for outside use.
2. The reading of books and periodicals and access to reference material within the library. This also could be thought of under the subdivision of required and optional reading.
3. The use of the library building for conferences and seminar work.
4. Faculty research.

Service. The first use of the Dartmouth Library, as outlined, is the storage and service end. This use is at the heart of the Library, and about it one must plan the other uses. At Dartmouth the main entrance of the building is directly to the delivery hall and desk, with service space behind it opening direct to the stacks where the service elevators, booklifts, etc., are found. This is important, as the books to the delivery desk are from the stacks direct to the borrower. The card catalogs for this service are to the right of the delivery desk in the large hall. The cataloguing room that functions with the card catalog is directly behind the card catalogs. This relationship is necessary, as is also the contact between the catalog room and the stack. To the left of the cataloguing room is the order room, where the new books are accounted for. Below the order room is the receiving room; all these rooms use the same elevator service in their relation to the stack, and this makes for economy of space.

The stack is the center of the Library plan, just as the books supply the reason for the building. It is important at this point to mention that library expansion is primarily a matter of book expansion. The stack, therefore, should have opportunity for unlimited growth. It is contemplated in this plan to extend a large stack across the north of the building, connecting the northeast and the northwest wings, increasing the stack capacity from 500,000 to 2,000,000 volumes, and in the future to whatever stack capacity is necessary, without restriction.

Reading Rooms. Having built the service end of the Library, the architect's problem was to arrange for the second use, or the reading of books, periodicals, etc., within the building. First came the problem of the reserved books which are loaned for short periods as assigned reading in class work. This was allotted to the basement or ground floor, with a delivery desk of its own. The assigned reading required reading room space within the Library, since these books must be used there. The large hall in the basement at the delivery desk point is used as a reading room for those wishing merely a quick glance at books, while the northeast and southeast reading rooms are for the full use of this material. The students are allowed to smoke in the two study rooms so that they do not need to carry the books out of the control of this floor. This makes the basement floor then, from the center into the east wings a separate unit from the rest of the Library, though it has, as elsewhere, direct contact with the stack for the obtaining of book material. The next use of books is on the first floor in the northeast wing, which is for reference material. Here information on a definite subject is sought, but as the reader does not know exactly where it is to be found, he needs the opportunity of consulting bibliographical aids and of obtaining the assistance of someone experienced in the use of those aids. The reference librarian's office is between the reference room and the periodical room on the axis of the large entrance hall.

The problem of the periodical room was difficult. Libraries have different methods of housing their periodicals. Here the architect carefully analyzed each in turn, and the conclusion was that he would rather have a room more architecturally charming than most of those which were seen. The periodicals are housed in cases between the

Reproduction of Original Dartmouth College Library

windows, forming alcoves. The periodicals are kept on open shelves in these cases, with tables at the center of the room for comfortable study. In this way it is possible to house an assortment of over a thousand different periodicals in a highly attractive manner, so that their use is more frequent than in a more formal or systematic scheme. On this floor there is also provided in the southwest wing a study room for such students as find it difficult to study in their dormitories or fraternity houses. It is informally furnished for the purpose of study. There are tables of varying sizes at the center of the room, with small tables for two men each between the windows. There is some lounge furniture in this room to take off the formality of the reading room. It is quite simple in architectural character, a fireplace at the north end of the room adding materially to its interest.

The "treasure room" in the northwest wing with the archives room under it is where the valuable book material of the College is kept behind grilled doors. This room was a class gift and has some very interesting features. The windows have leaded glass inner sash with various seals and medallions of the College, and in the small panes are illustrations from photographs burned into the glass to give a permanent record of the class. The class records are kept in a secret compartment in the room under the control of the class secretary.

On the second floor over the delivery hall is a large room divided into three units. This is really the browsing room in literature. Here there has been created a room more like a reading room of a large club, with fireplaces, very comfortable chairs and beautiful furniture. The walls are oak paneled, with a gallery over the alcoves. Each alcove is given over to books of special interest to the various departments. These books are of the more popular type and are there to tempt the students to read books in fields other than those in which they are majoring. The custodian of this room is an interpreter of books and an aid to the students in their digressions. The most interesting feature of this room, architecturally, is the entrance through doors underneath the gallery. The object here is to make it the end of a journey, and the effect of the small doors under the gallery is to make the room very much quieter. The fireplaces are placed at the ends of the room where normally large monumental entrances would have been. The room would then, of course, have been a hallway. This room is ex-

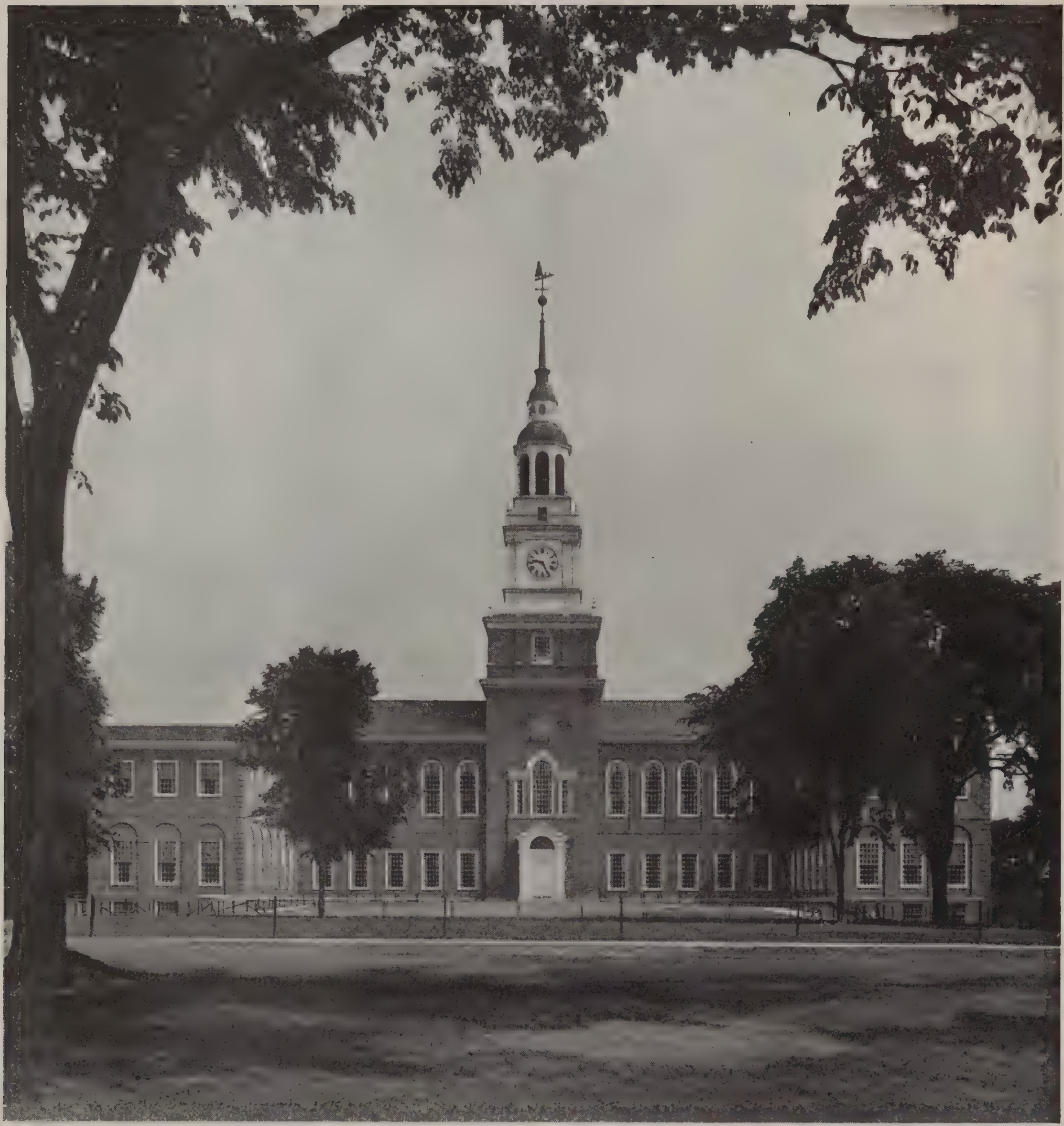
Entrance to Reproduction of Original Dartmouth College Library

tensively used by the students and faculty. It is serving its purpose and has proved a very worthwhile investment for the College. The stack is also used for the reading of books. It is open to the students at large. Tables have been provided at the windows for the reading of books in the stack. The architect was careful to plan the stack to give a large window capacity for examination of books. Giving access to the open stack is a very important policy in the use of the Library at Dartmouth, and it works successfully.

Conference and Seminar Rooms. The use of the Library for conferences and seminar work was necessary to bring the faculty and students together for conferences with books under the most satisfactory conditions. As the College works on a departmental basis, it was thought advisable to provide centers with books pertinent to their courses. The seminar rooms are for larger groups numbering up to 15, while the conference rooms are for smaller units of not more than eight students. These rooms are carefully scheduled for time and use, and are serving their purpose.

Faculty Research. Provision for faculty research and for creative work where the source of inspiration is books has been taken care of by providing small rooms 8 feet square off the stack proper on four of the book levels. These are allotted to the members each semester, and an attempt is made to place them as near as possible the books they wish to use. These rooms are very carefully planned for isolation. A locked door leads to a corridor from which open the offices. They are not provided with telephones or any other means of interruption. The purpose, as just said, is to allow the faculty to work without interruptions. There are 56 of these offices, and they are always in demand. In conclusion, the Library has been planned around the expected needs of Dartmouth College, and is functioning adequately.

At the dedication the librarian said that every achievement of the human spirit is based chiefly on faith, and that those who planned this Library planned it with faith, and worked into its very fabric certain beliefs which none can prove. They believed that more and more Dartmouth College will teach that all things interlock about a central reality,—therefore they planned so to place the building that it be at the heart of the campus, yet so that related buildings could be grouped about it; to draw in all the books of the College; to keep the books for the most part central in the building, not dispersed. They believed that to surround young men with beauty is good,—a part of their education. Therefore of certain rooms the design, color and furnishings were studied as prob-



View from Campus

lems in the creation of beauty. They believed that students should be given a chance to acquire the habit of reading, as a resource for leisure, as the surest way to retain a keen and useful mind; therefore, the Tower Reading Room,—an experiment in the cultivation of the reading habit. No rules or restrictions are posted here. It is assumed that the room and its contents will be regarded as one would the library of one's club. It is possible that in after years some students may feel that in this room were spent some of the most valued hours of their college life. Now and then during the winter, poetry or prose is read aloud here by members of the faculty, with lights dim, the fire glowing, and coffee served in the background. By day the great windows look down upon the campus. If the library is in some sense the heart of the college, this room is the heart of the library. It is a place for the storage, distribution and use of books, and beyond that it is a place which will cultivate the love of books and the love of beauty. Of the background of these beliefs,—of a central reality, of beauty, of the best of the heritage of the past, the tower is the symbol,—for Dartmouth an inspiration; for the world, a sign. The building fits well into the collegiate group of which it is an important part, the group contributing much to the town's interest.

THE 1928 COMMON BRICK SCHOOL COMPETITION
STATEMENT OF THE JURY OF AWARD

ABOUT half of the 52 schools submitted did not, in our judgment, rise to the standard in schoolhouse design which the competition would seem to merit. This portion of the entries could hardly be called representative of the best work done by the architects of the country, and it is evident that many architects responsible for the best in schoolhouse design did not participate. Many of the designs, however, evidence a clear understanding and a serious study of the problem, and show that restraint which is always the charm of good architecture and design.

After careful consideration of all the schools submitted in the competition, we have selected for the grand prize the design entered by Henry Y. Shaub, of Lancaster, Pa., being that for the Junior High School of Upper Leacock Township, Leola, Pa. This building is representative of schools for smaller communities which, after all, is the type in schoolhouse planning that has been least developed. This school may safely be taken as a model building for the small community. Its plan is simple, giving maximum opportunity for those diversified school and community uses which is so necessary when funds are limited. This entry possesses a charm that is rarely found in buildings of this kind. This same building was awarded the first prize in Class A of the competition for smaller buildings.

The plan awarded the first prize in Class B, representing the larger buildings, is that of Davis, Dunlap & Barney, Philadelphia, being the Cheltenham High School, Elkins Park, Pa. This building was selected for the reason that it typifies the correct use of architectural precedent when applied to modern buildings. The architects have successfully fitted their building to the site conditions. The designs selected for recognition are:

CLASS A

1st Prize—Henry Y. Shaub, Lancaster, Pa. Upper Leacock Township Junior High School, Leola, Pa.

2nd Prize—G. Howard Chamberlin, Yonkers, N. Y. Public School No. 11, Yonkers, N. Y.

3rd Prize—Victor Galbraith, Stockton, Cal. Harmony Grove School, San Joaquin Co., Cal.

1st Mention—Eric G. Flannagan, Henderson, N. C. Halifax Public School, Halifax County, N. C.

2nd Mention—Victor Galbraith, Stockton, Cal. Davis School, San Joaquin Co., Cal.

3rd Mention—Frederick S. Stott, Omaha, Neb. Oakdale School, Douglas County, Neb.

4th Mention—Coffin & Coffin, New York, N. Y. Glenwood Landing School, Glenwood Landing, N. Y.

Extra Mention—Charles G. Loring, Boston. High School, Stoughton, Mass.

CLASS B

1st Prize—Davis, Dunlap & Barney, Philadelphia. Cheltenham High School, Elkins Park, Pa.

2nd Prize—Dean & Dean, Sacramento, Cal. Leland Stanford Elementary School, Sacramento, Cal.

3rd Prize—Palmer Rogers, New York. Northside High School, Corning, N. Y.

1st Mention—Wesley Sherwood Bessell, New York. Flower Hill School, Port Washington, N. Y.

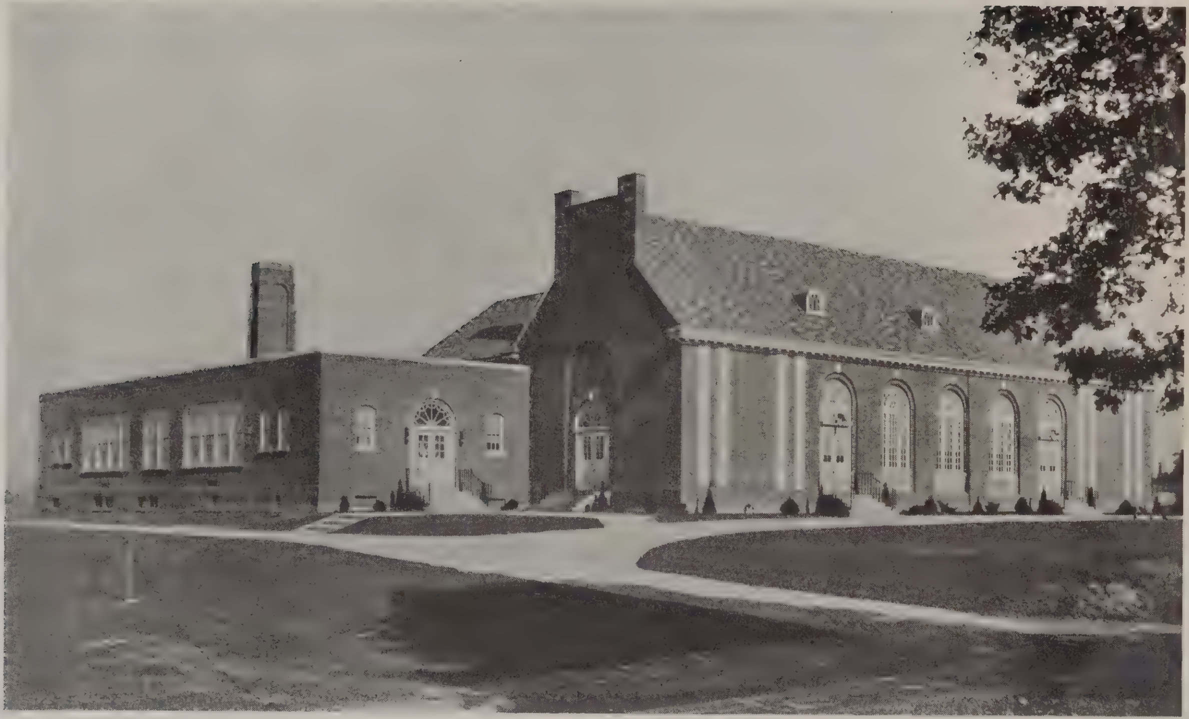
2nd Mention—Coffin & Coffin, New York. Locust Valley School, Locust Valley, N. Y.

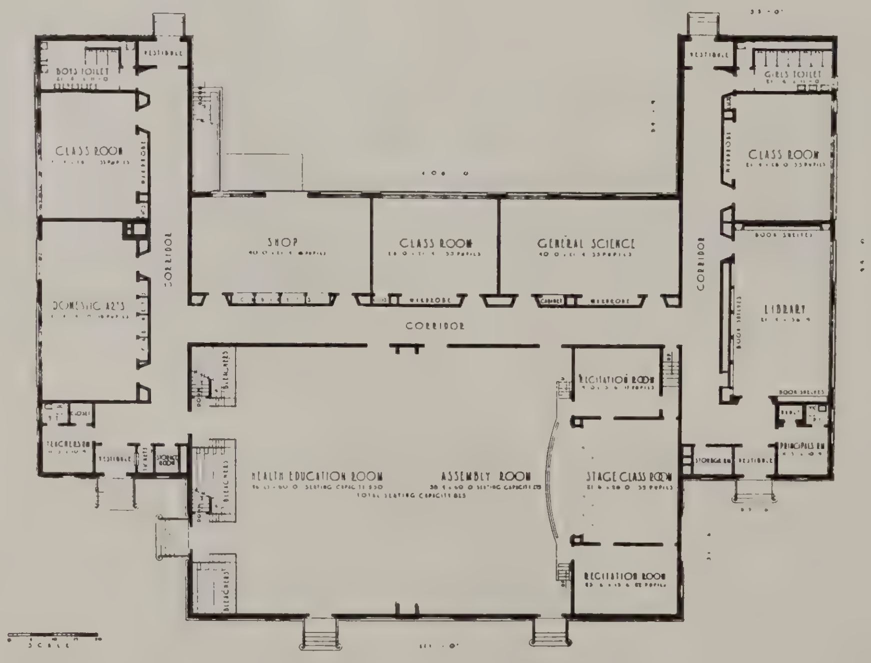
3rd Mention—Eliel Saarinen, Bloomfield Heights, Mich. Cranbrook School, Bloomfield Hills, Mich.

4th Mention—Dean & Dean, Sacramento, Cal. Sacramento Junior College, Sacramento, Cal.

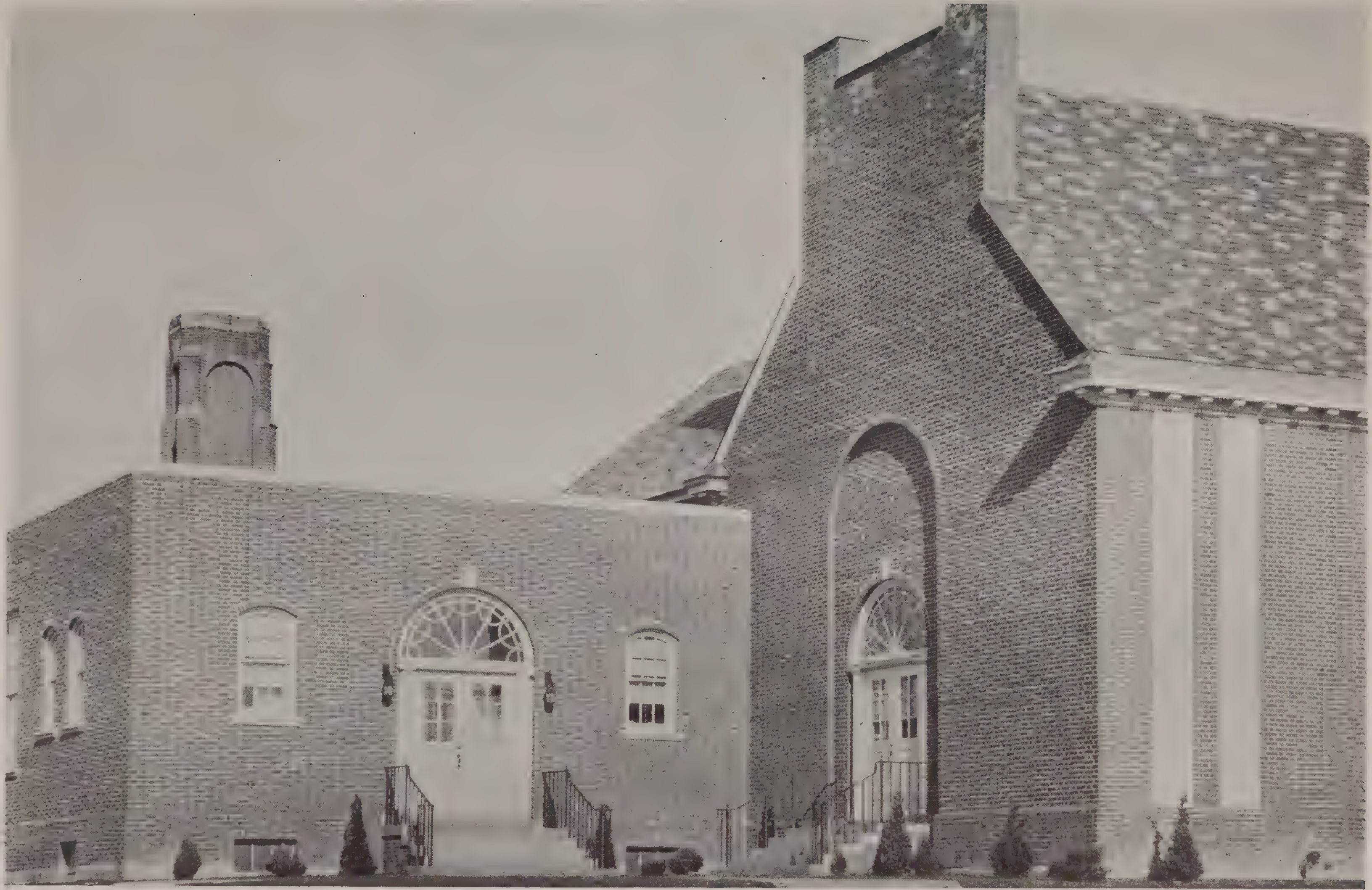
Extra Mention—Blaine & Olson, Oakland, Cal. W. P. Frick School, Oakland, Cal.

WILLIAM B. ITTNER, JR., J. O. BETELLE, W. R. McCORNACK.





FIRST PRIZE, CLASS A, AWARDED TO HENRY Y. SHAUB, ARCHITECT, LANCASTER, PA.
UPPER LEACOCK TOWNSHIP JUNIOR HIGH SCHOOL, LEOLA, PA.



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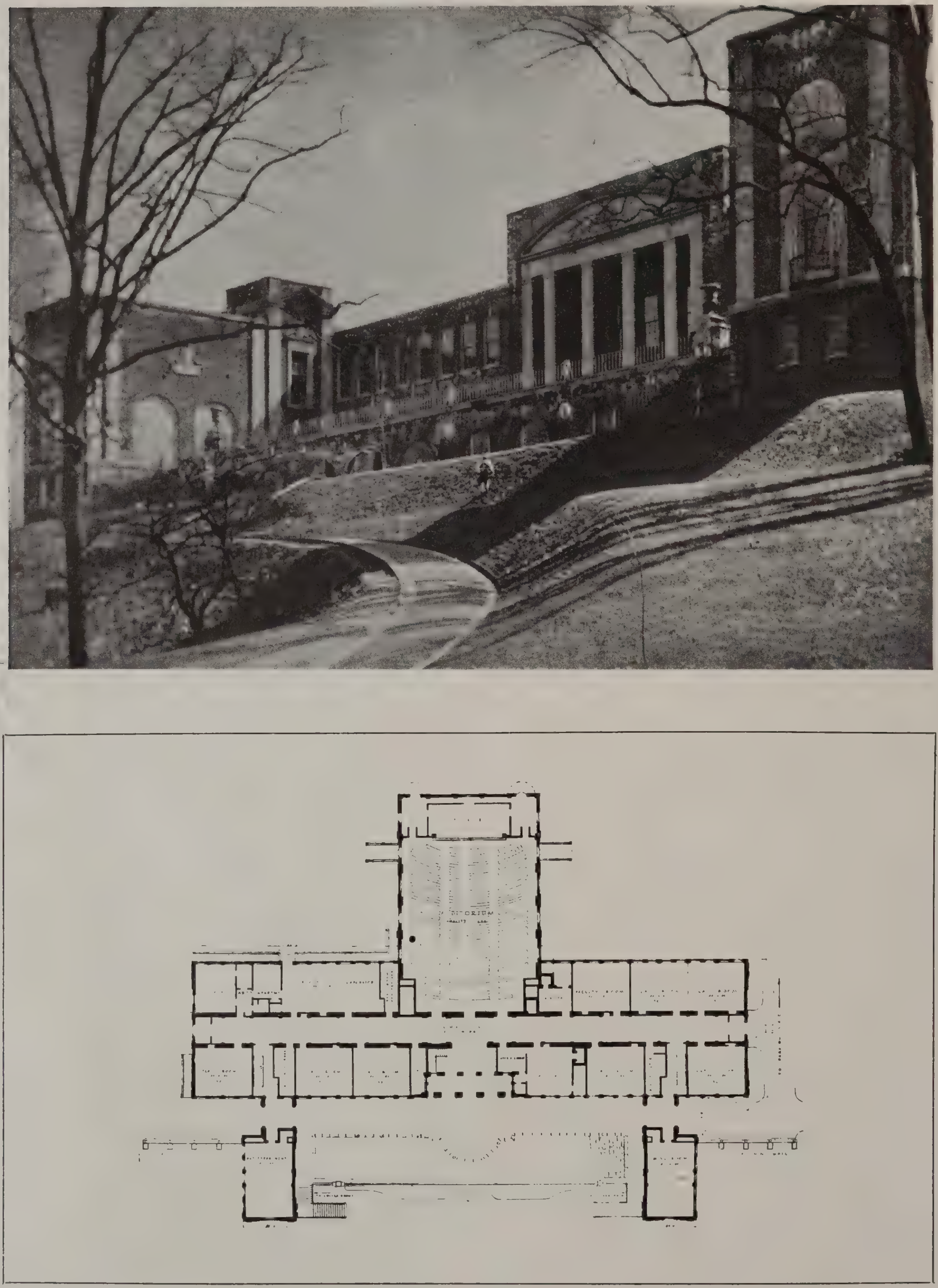
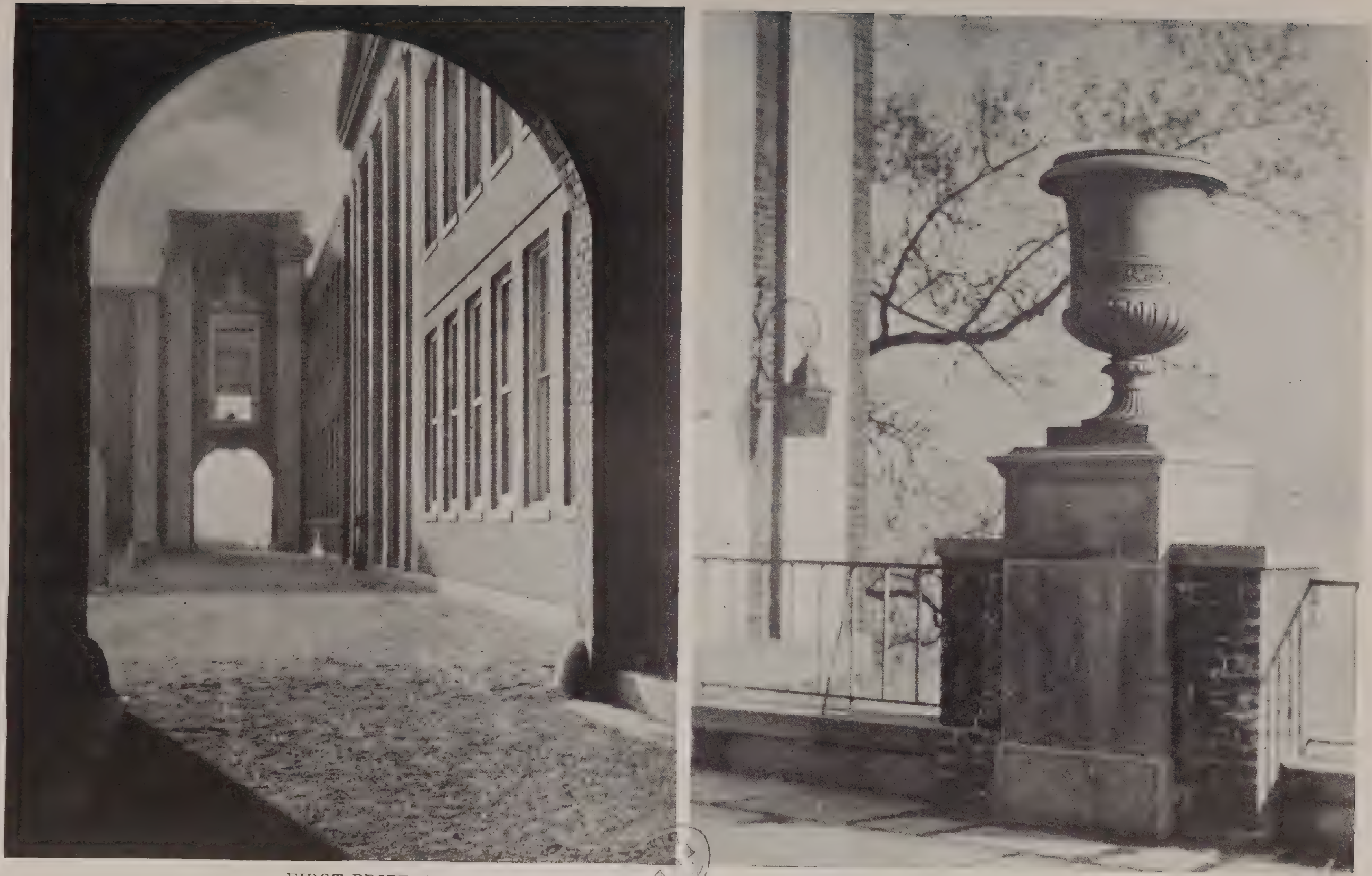


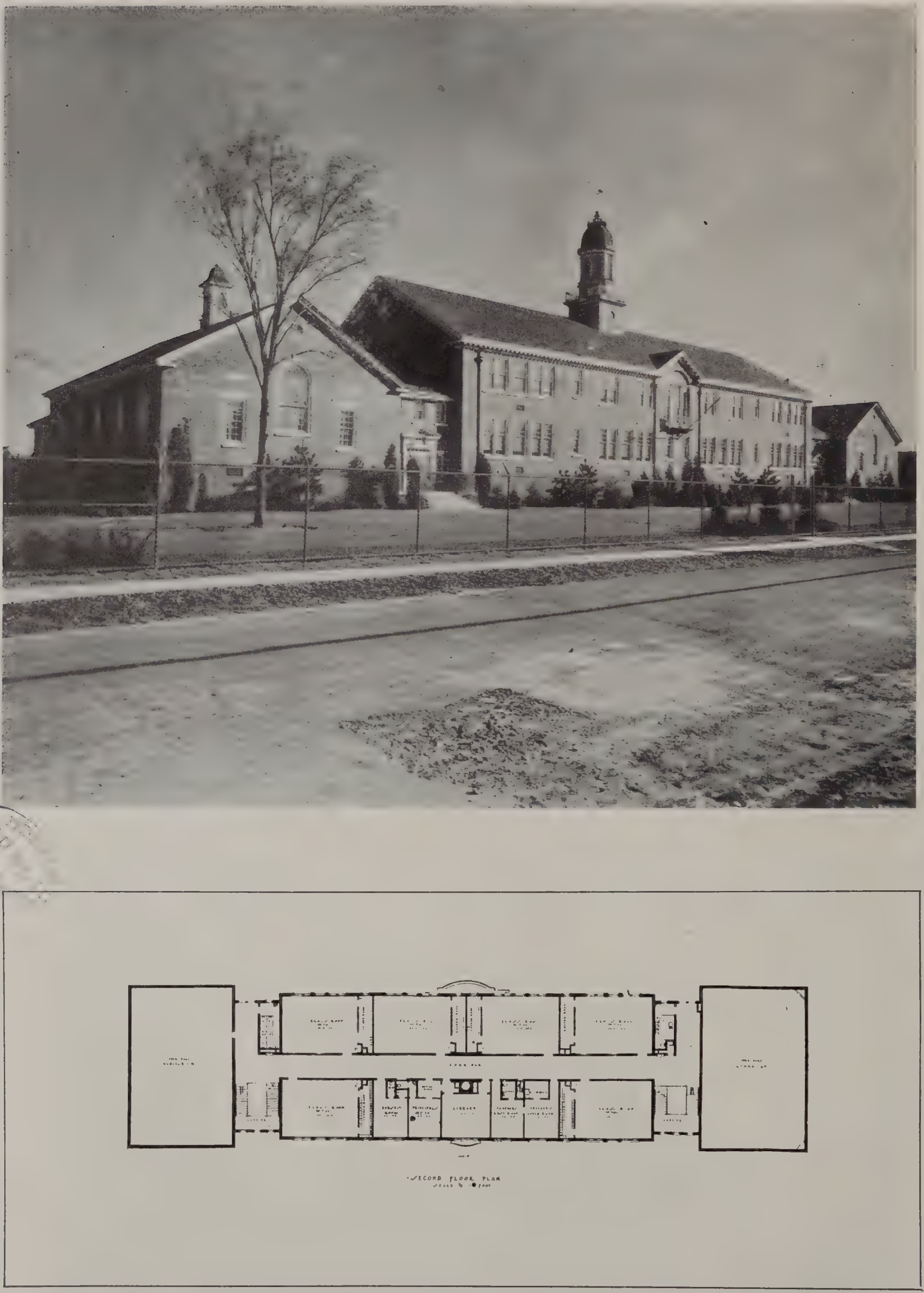
FIRST PRIZE, CLASS B, AWARDED TO DAVIS, DUNLAP & BARNEY, ARCHITECTS, PHILADELPHIA

CHELTENHAM HIGH SCHOOL, ELKINS PARK, PA.

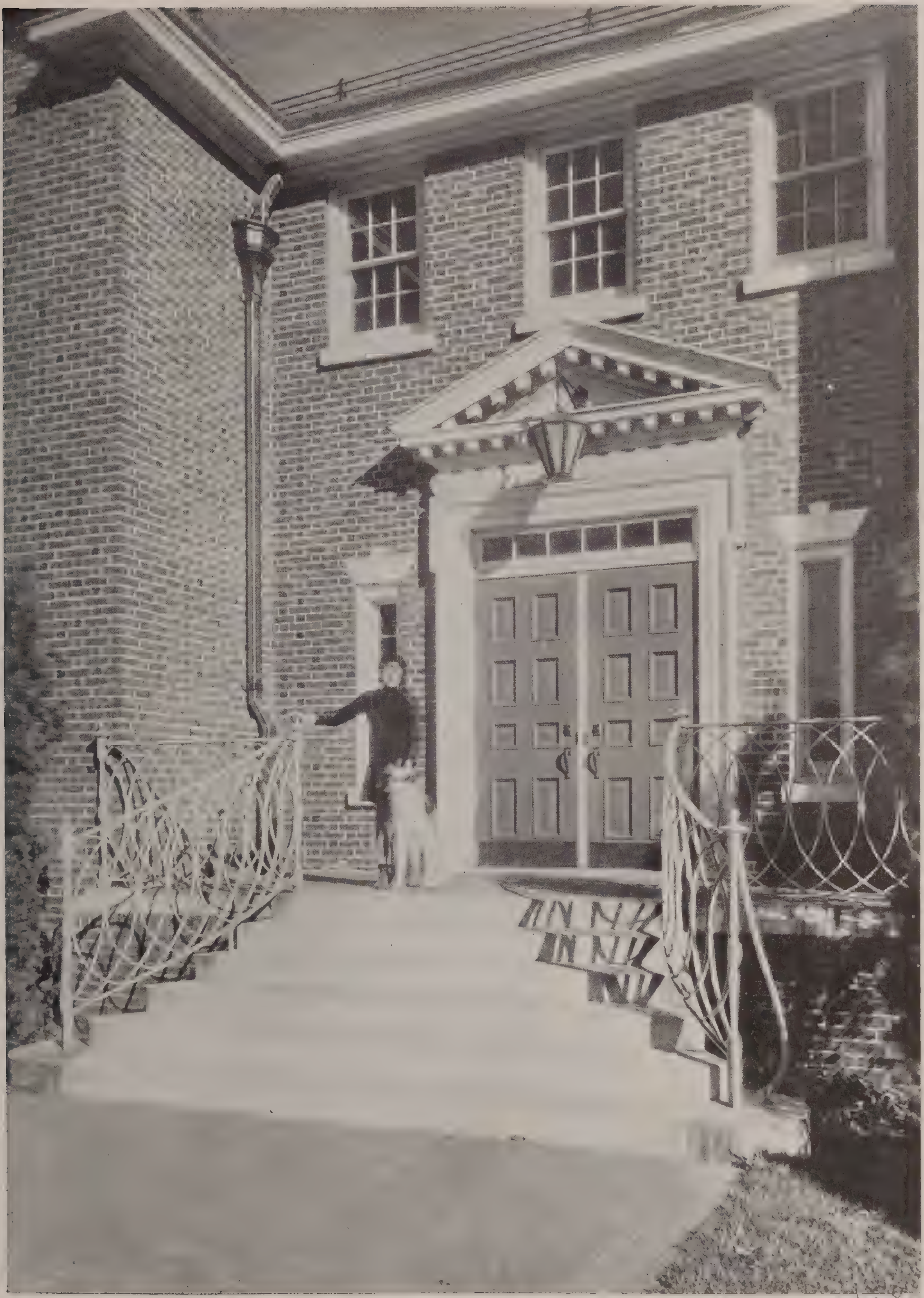


FIRST PRIZE, CLASS B, AWARDED TO DAVIS, DUNLAP & BARNEY, ARCHITECTS, PHILADELPHIA

CHELTENHAM HIGH SCHOOL, ELKINS PARK, PA.



SECOND PRIZE, CLASS A, AWARDED TO G. HOWARD CHAMBERLIN, YONKERS, N. Y.
PUBLIC SCHOOL NO. 11, YONKERS, N. Y.



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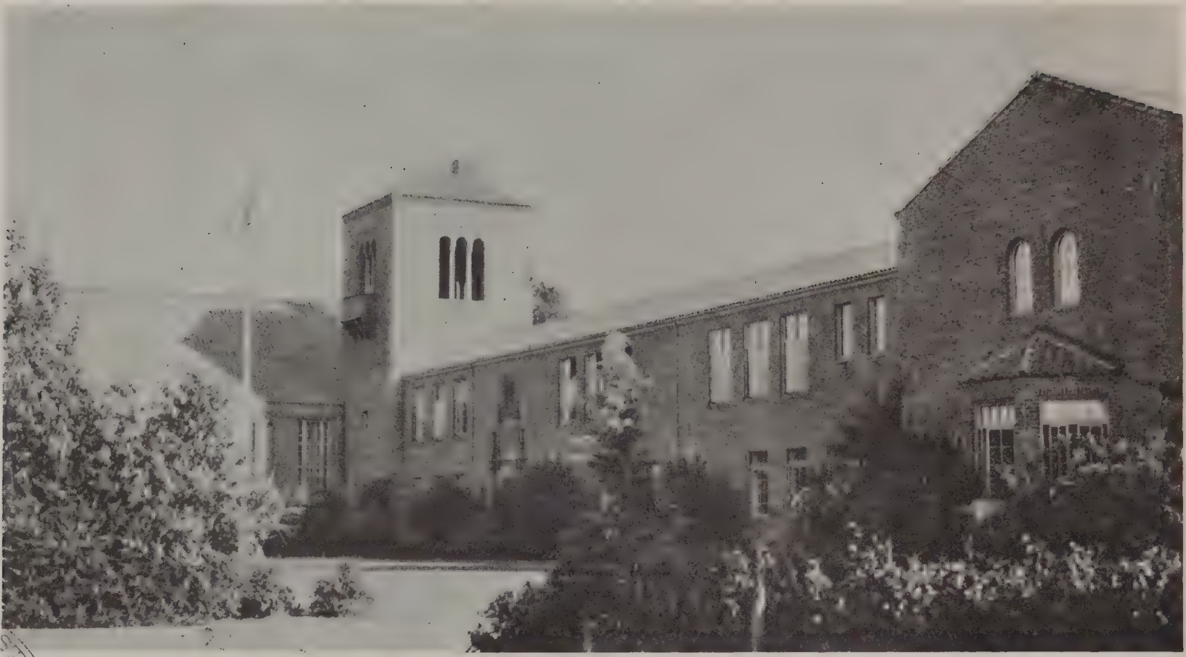
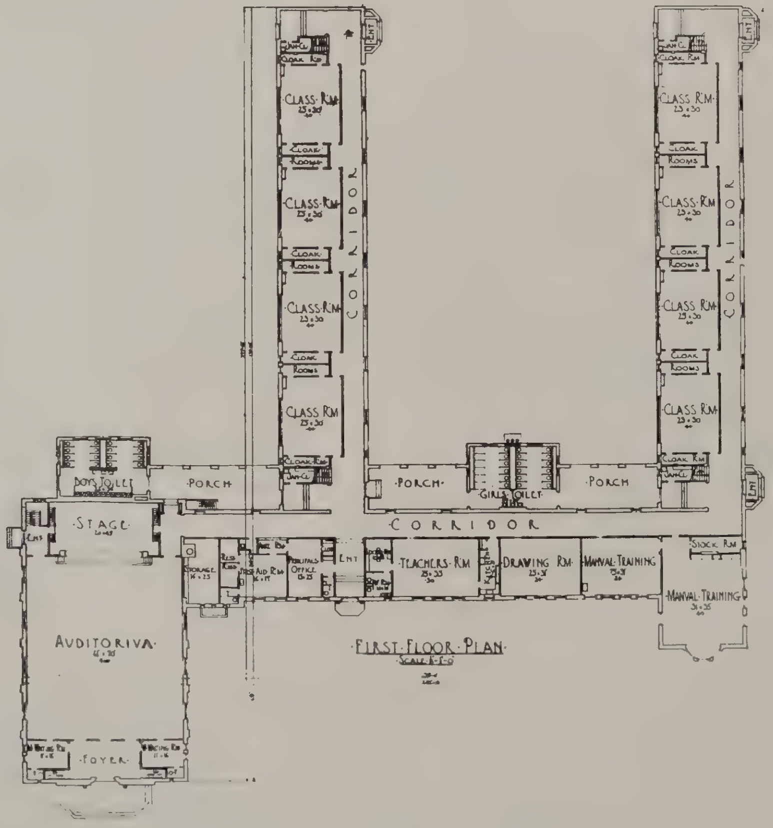
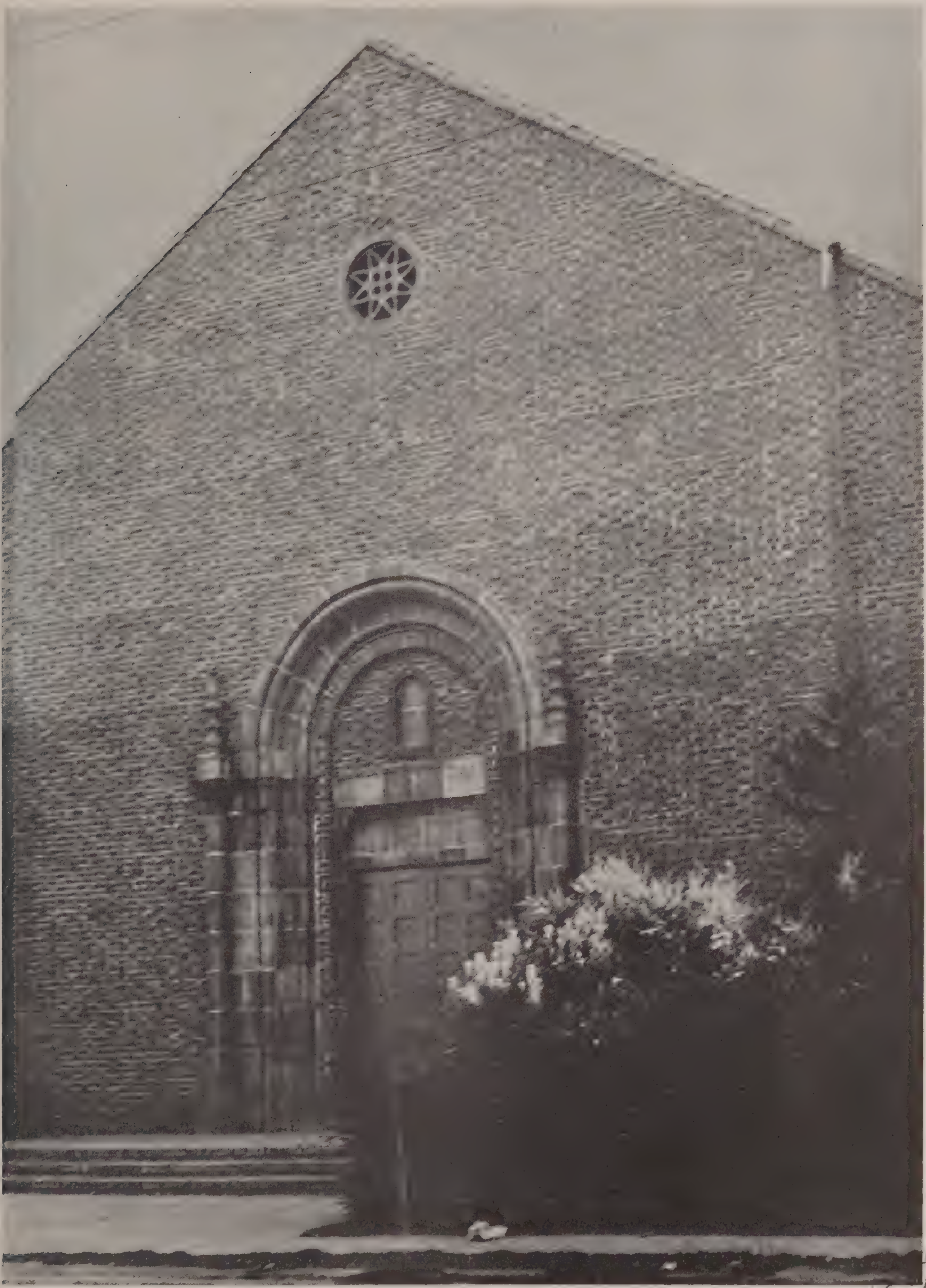


BOSTON PUBLIC

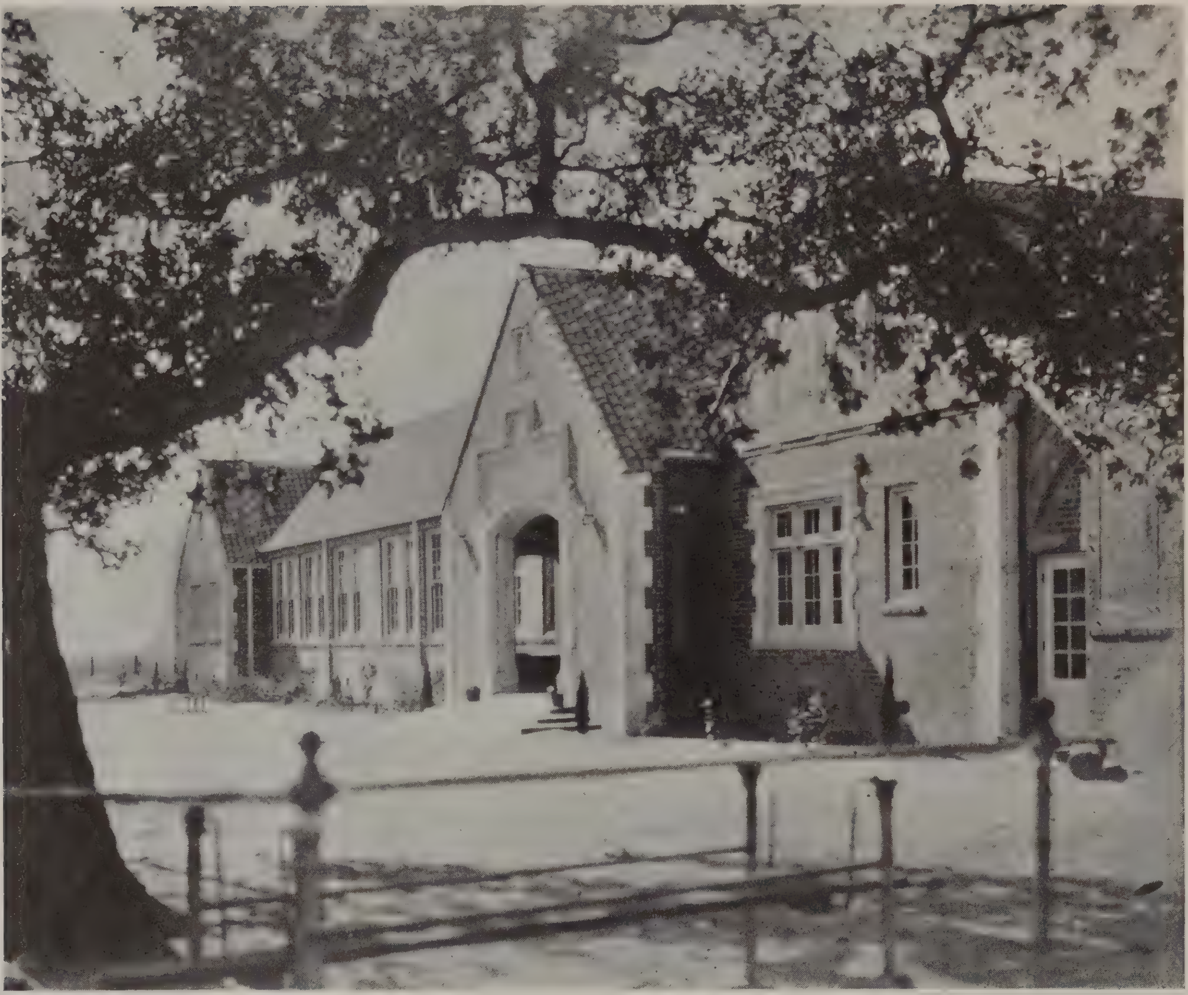


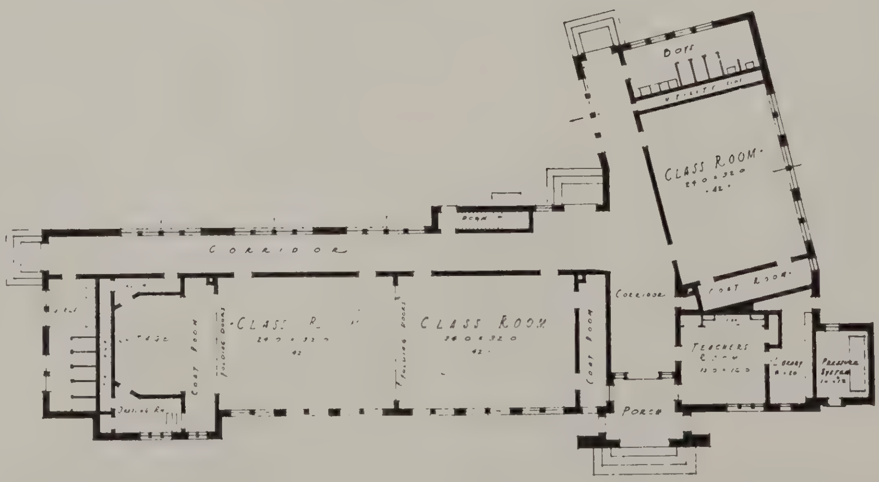
SECOND PRIZE, CLASS B, AWARDED TO DEAN & DEAN, ARCHITECTS, SACRAMENTO
LELAND STANFORD ELEMENTARY SCHOOL, SACRAMENTO



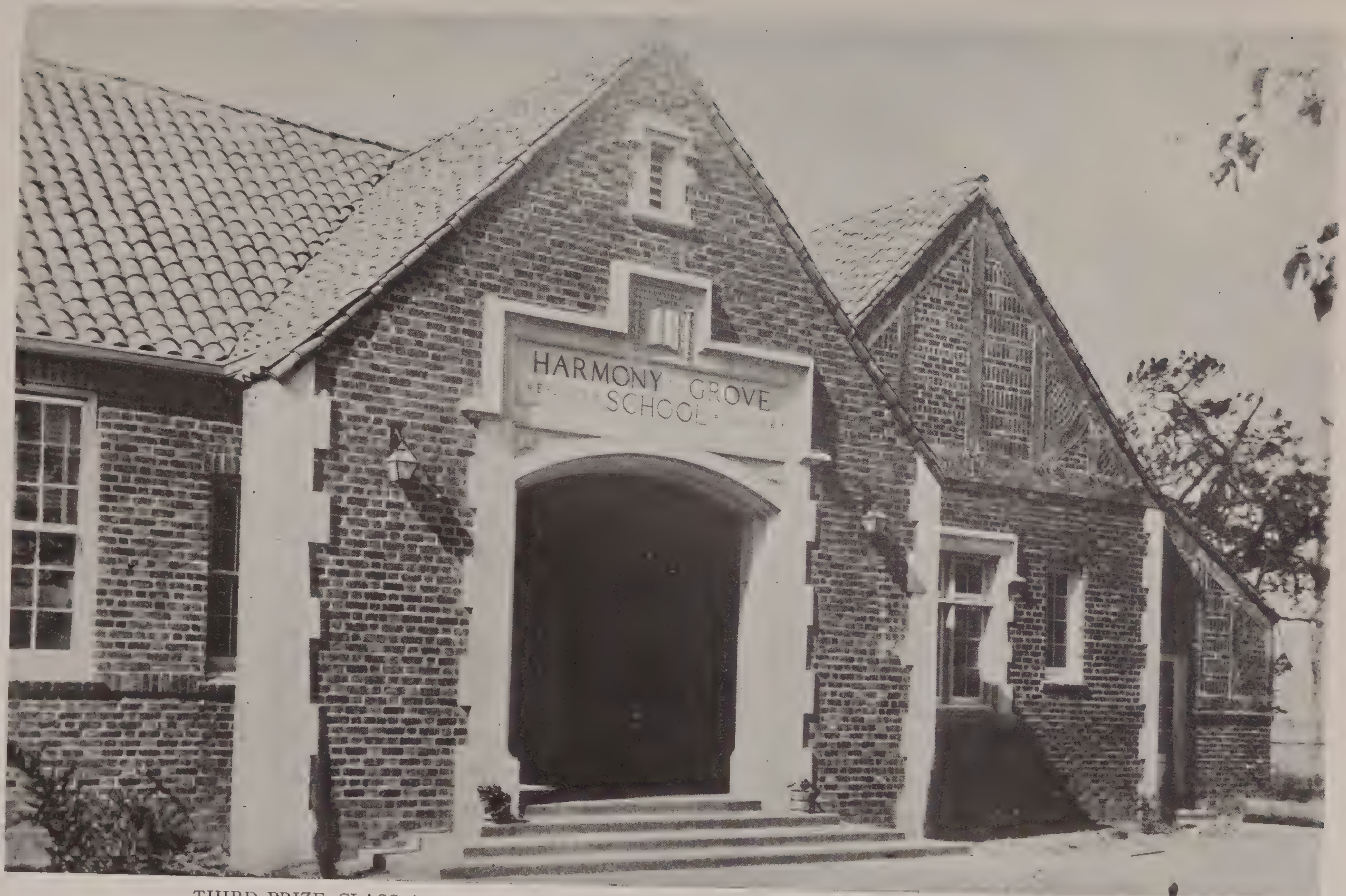
SECOND PRIZE, CLASS B, AWARDED TO DEAN & DEAN, ARCHITECTS, SACRAMENTO
LELAND STANFORD ELEMENTARY SCHOOL, SACRAMENTO

BOSTON PUBLIC LIBRARY

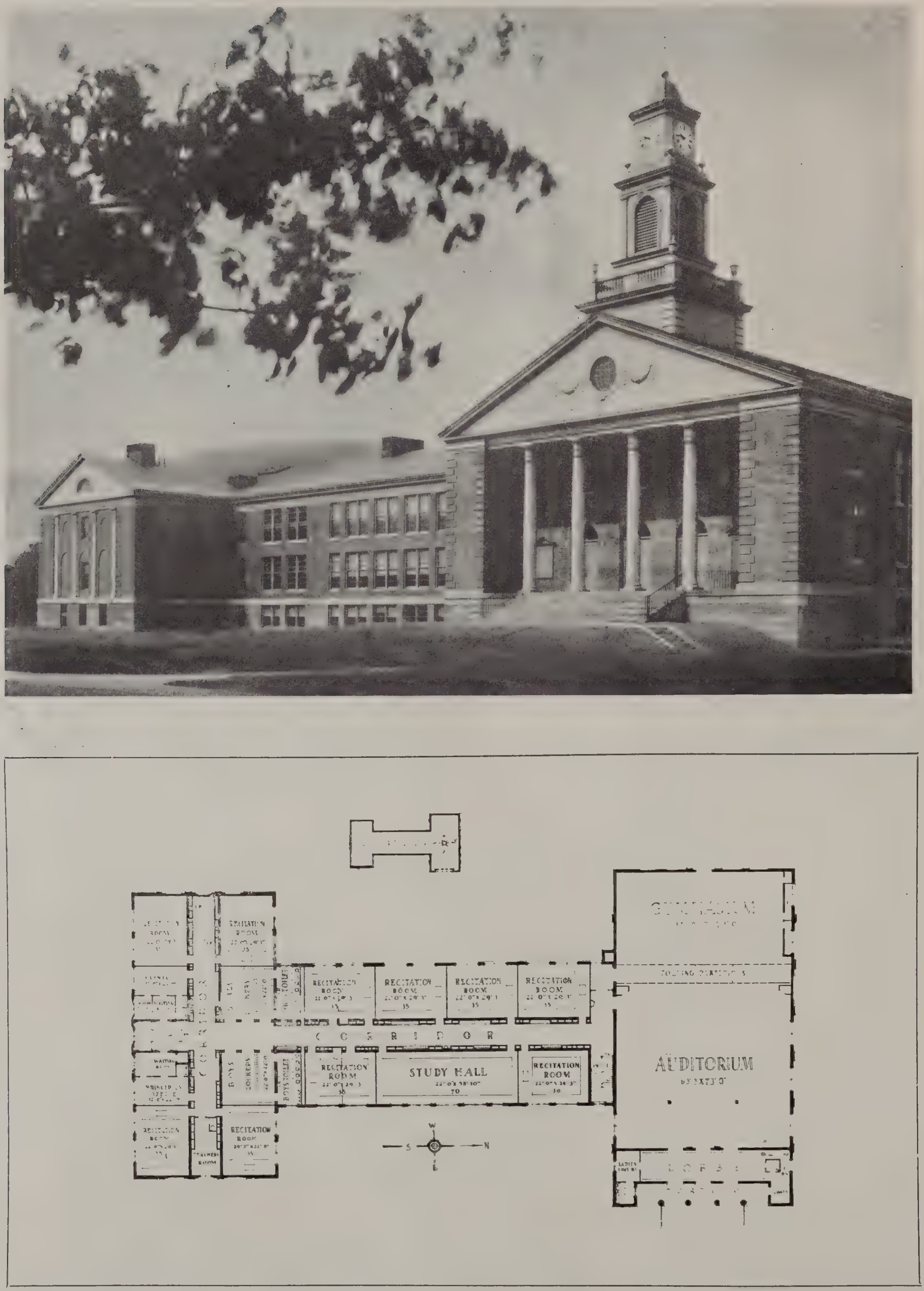




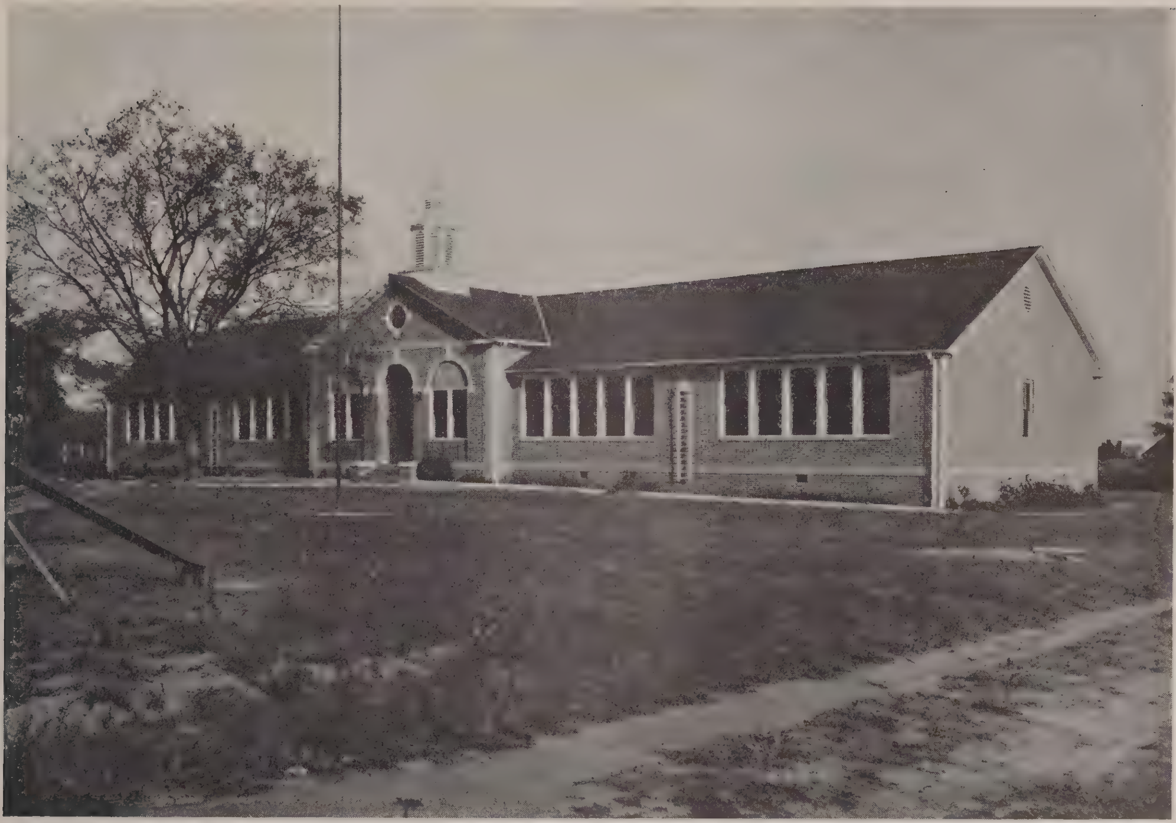
THIRD PRIZE, CLASS A, AWARDED TO VICTOR GALBRAITH, ARCHITECT, STOCKTON, CAL.
HARMONY GROVE SCHOOL, SAN JOAQUIN COUNTY, CAL.

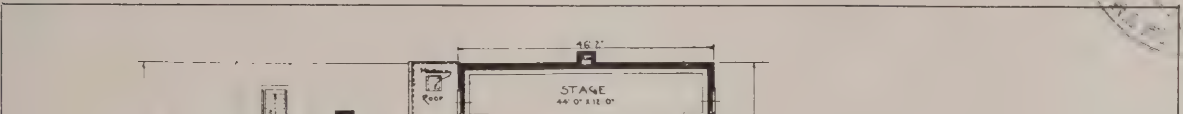


THIRD PRIZE, CLASS A, AWARDED TO VICTOR GALBRAITH, ARCHITECT, STOCKTON, CAL.
HARMONY GROVE SCHOOL, SAN JOAQUIN COUNTY, CAL.



THIRD PRIZE, CLASS B, AWARDED TO PALMER ROGERS, ARCHITECT, NEW YORK
NORTHSIDE HIGH SCHOOL, CORNING, N. Y.





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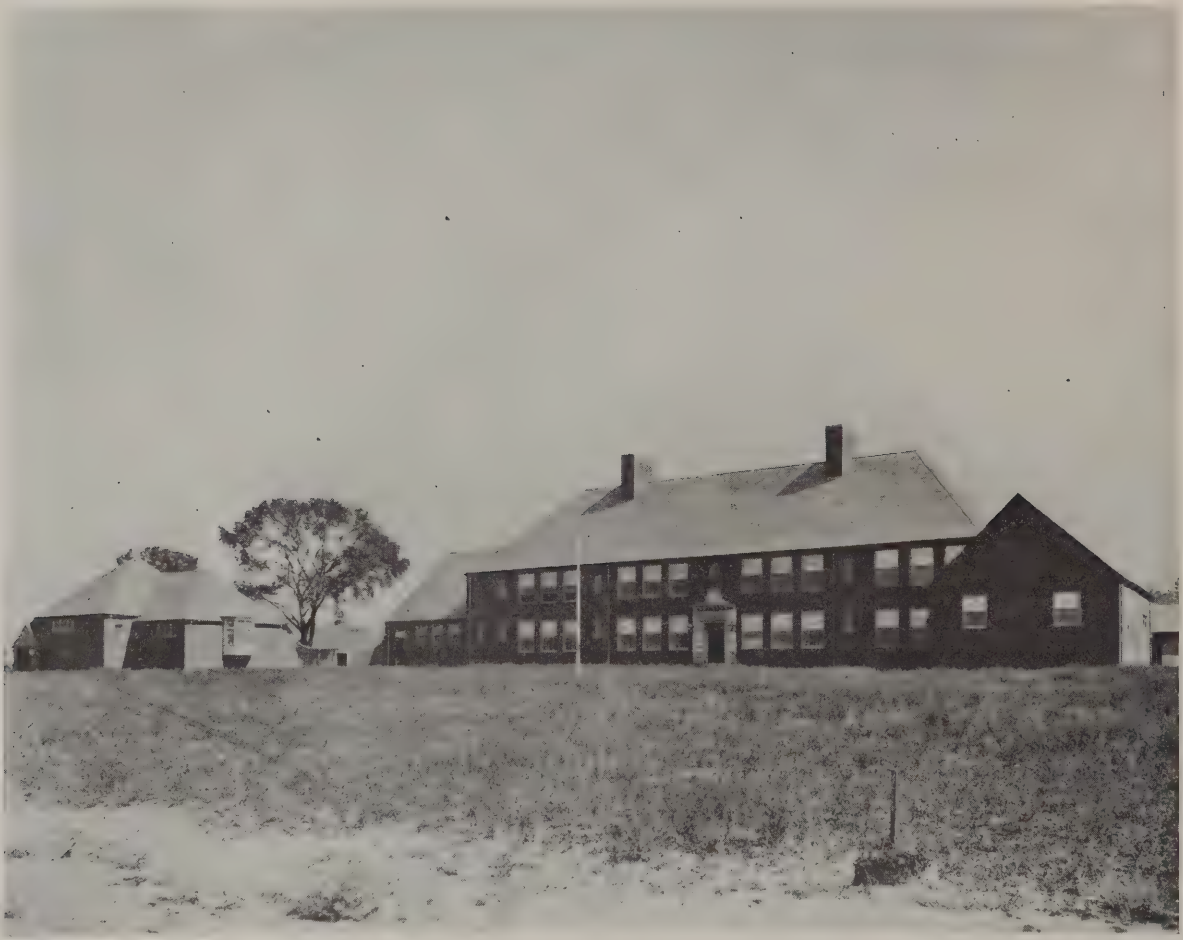

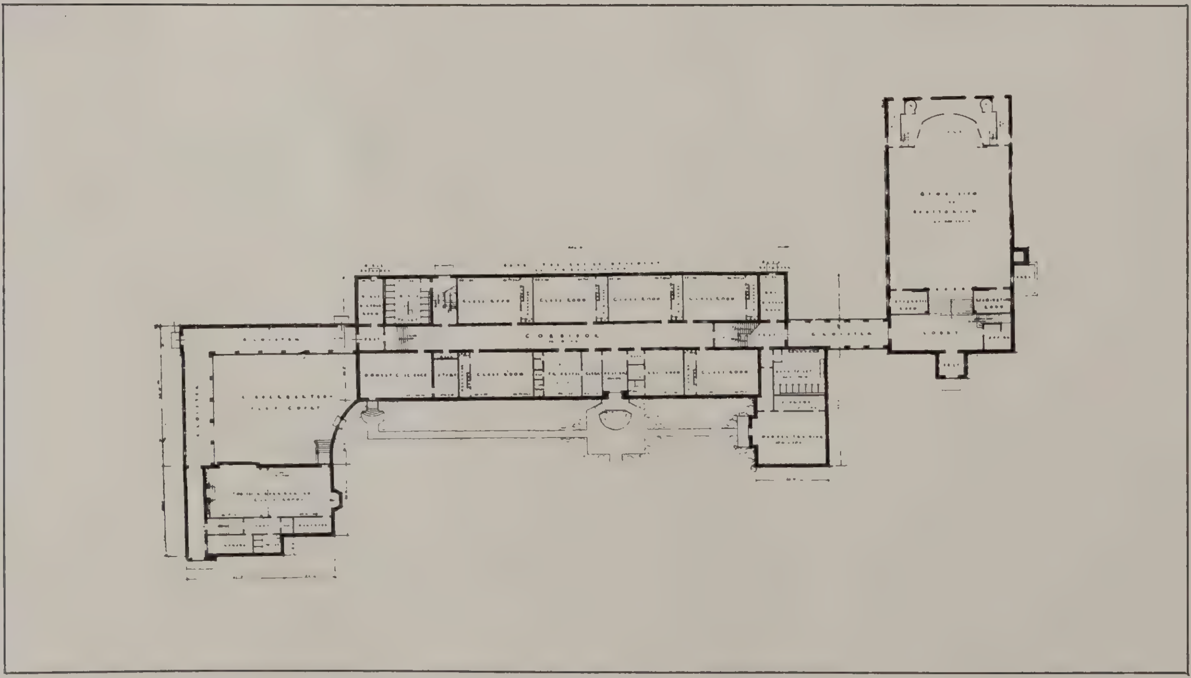

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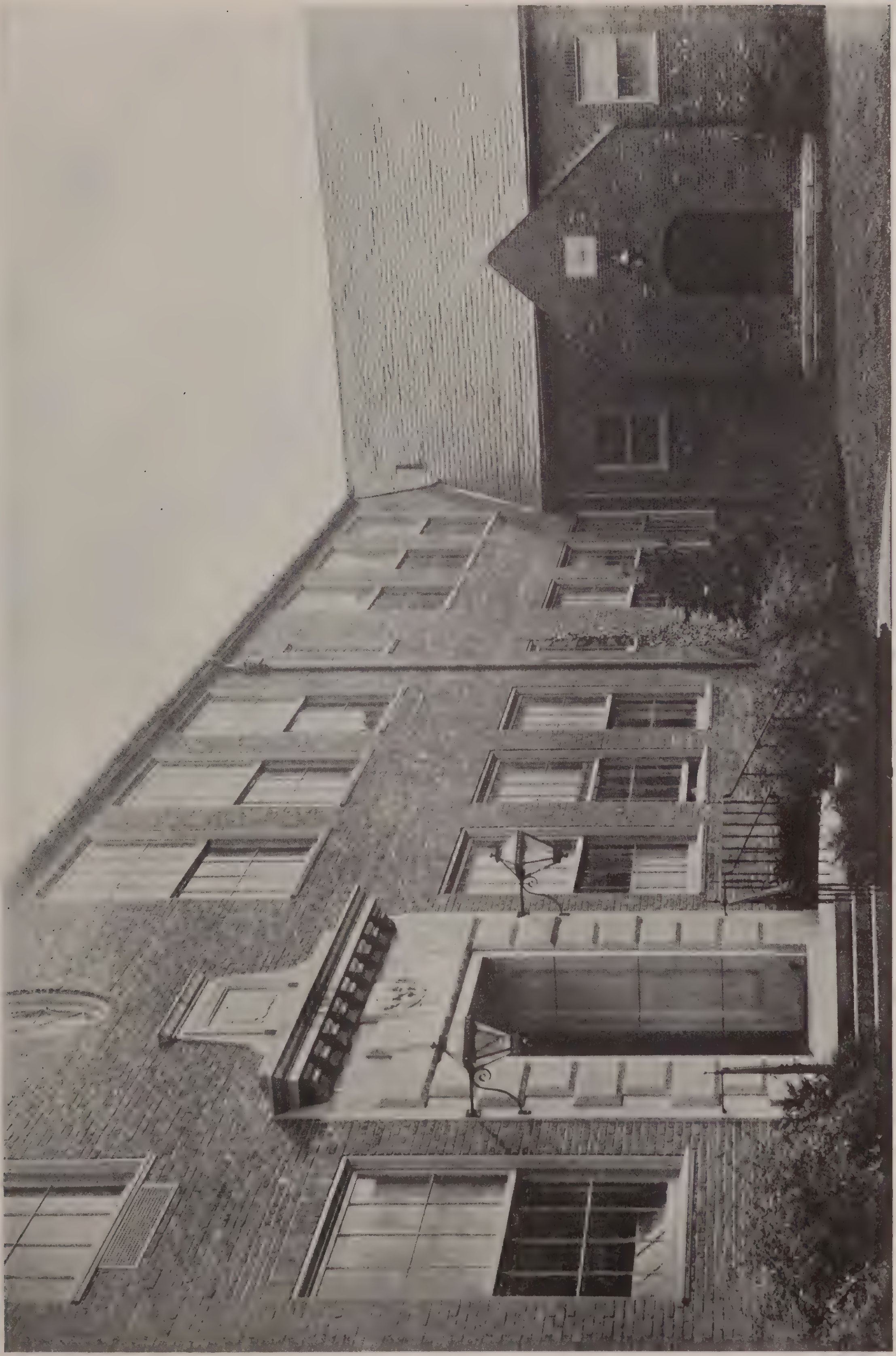

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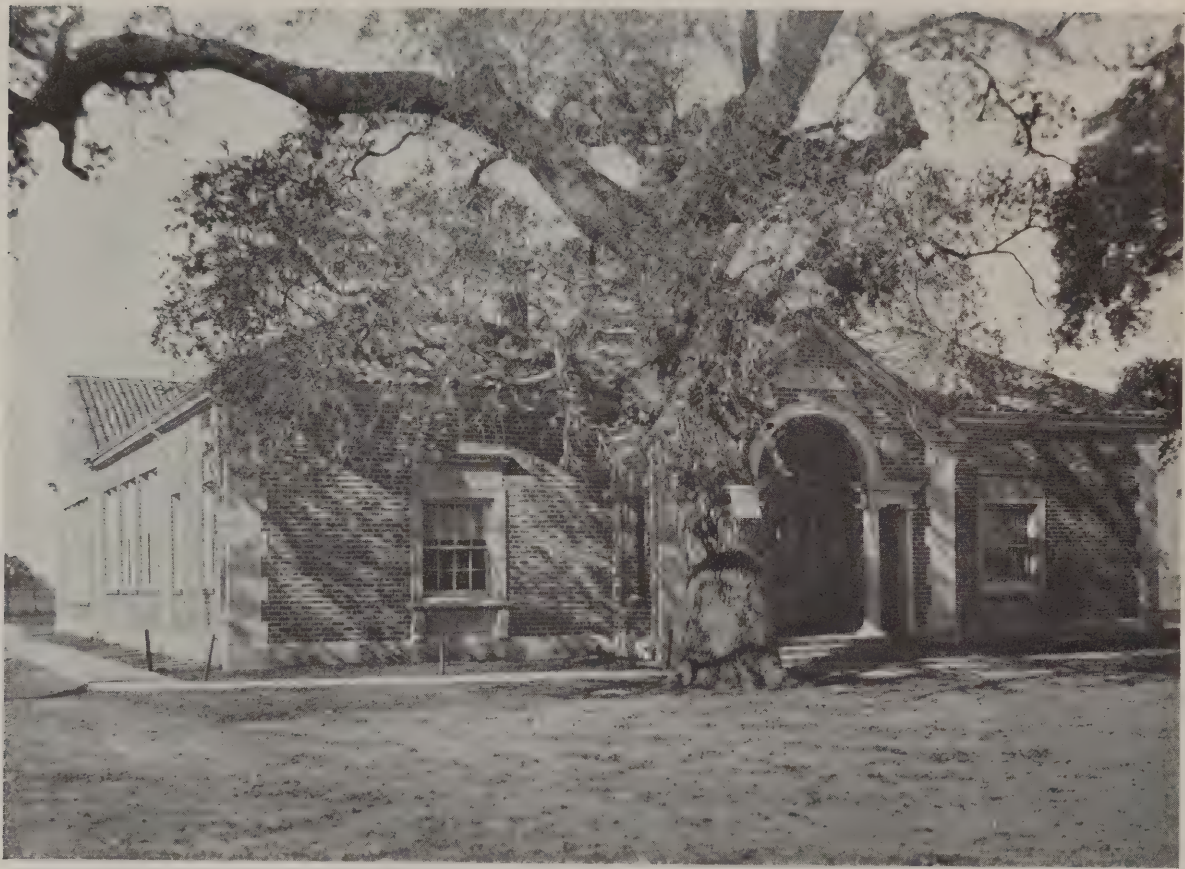

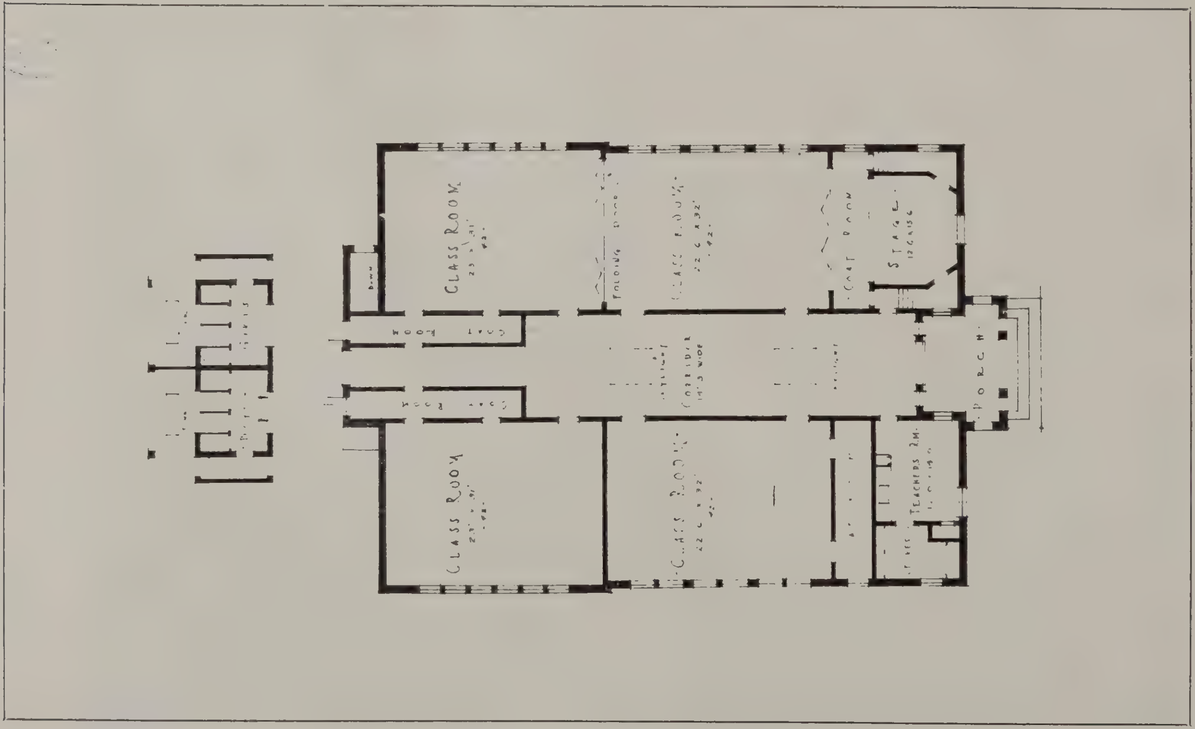

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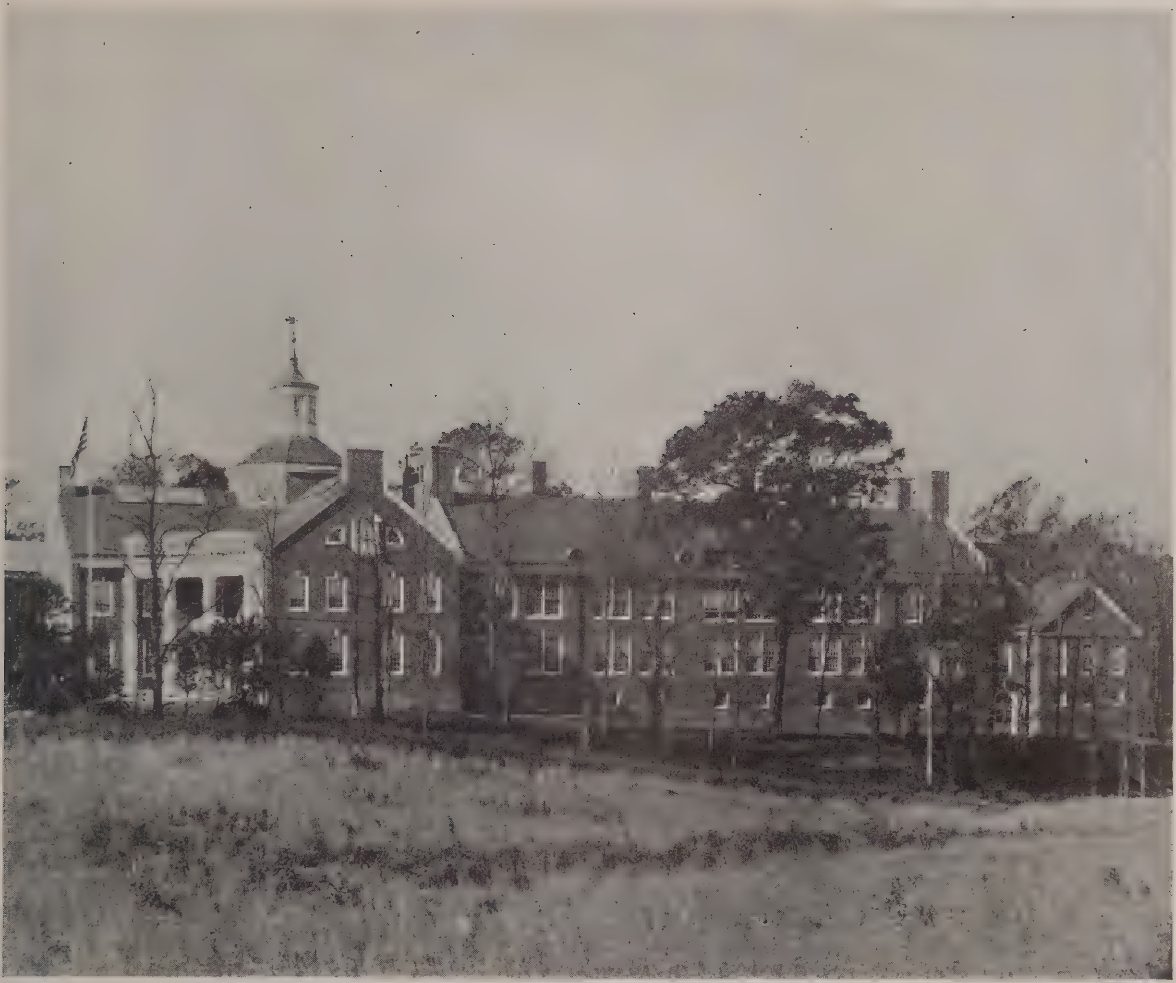

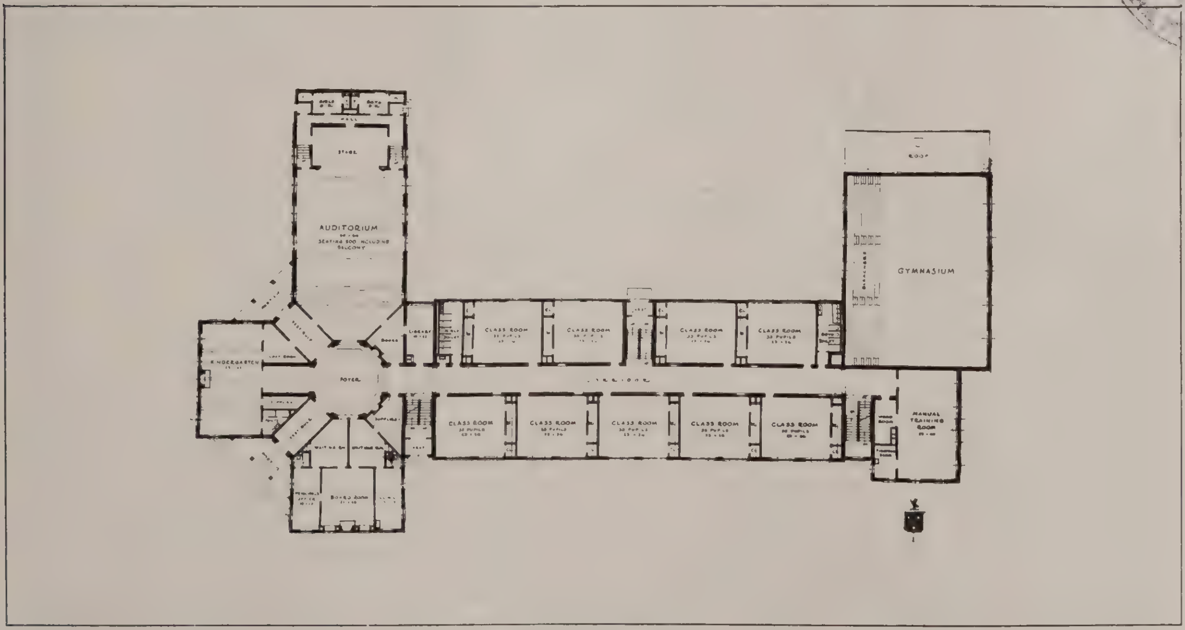

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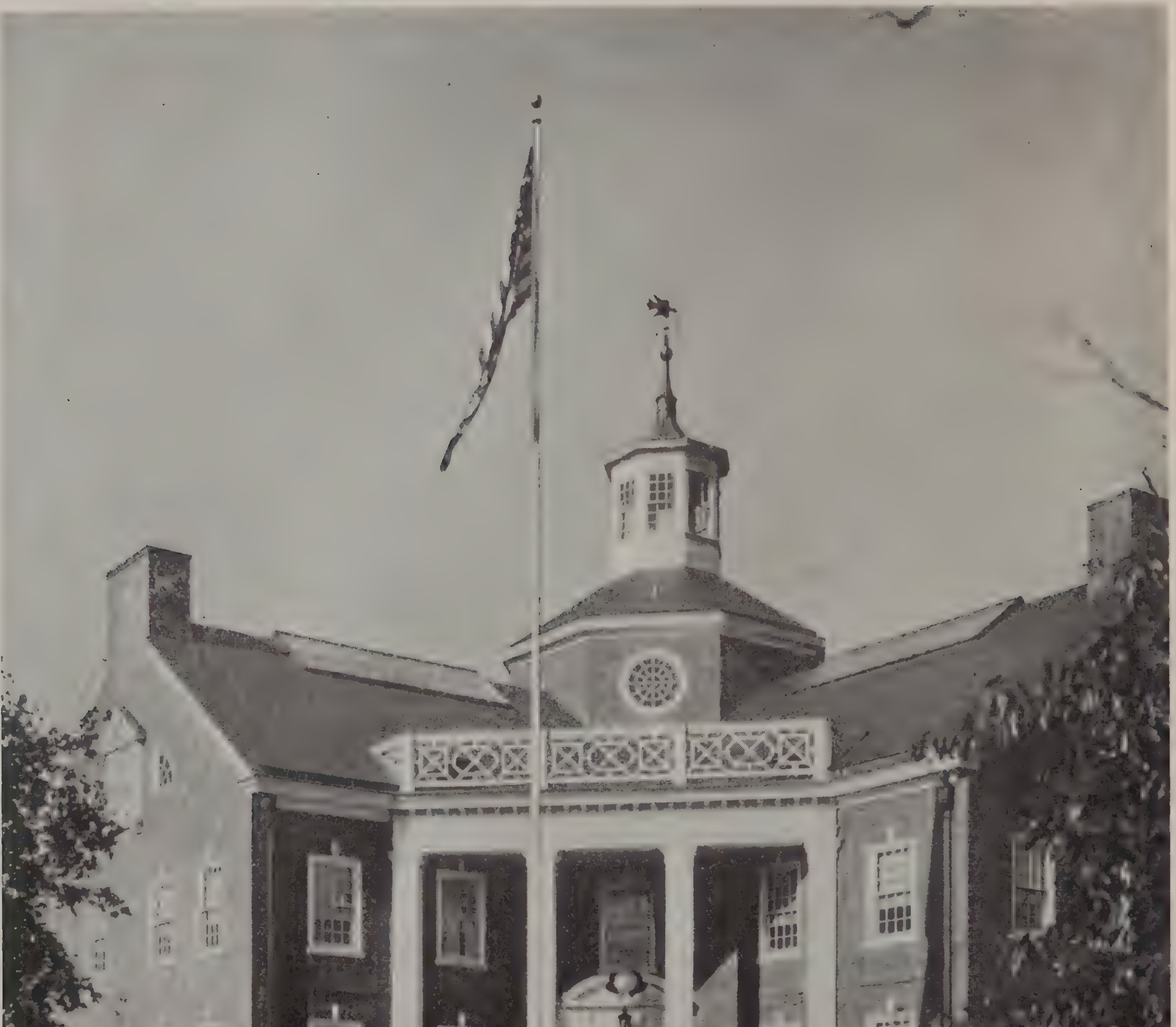

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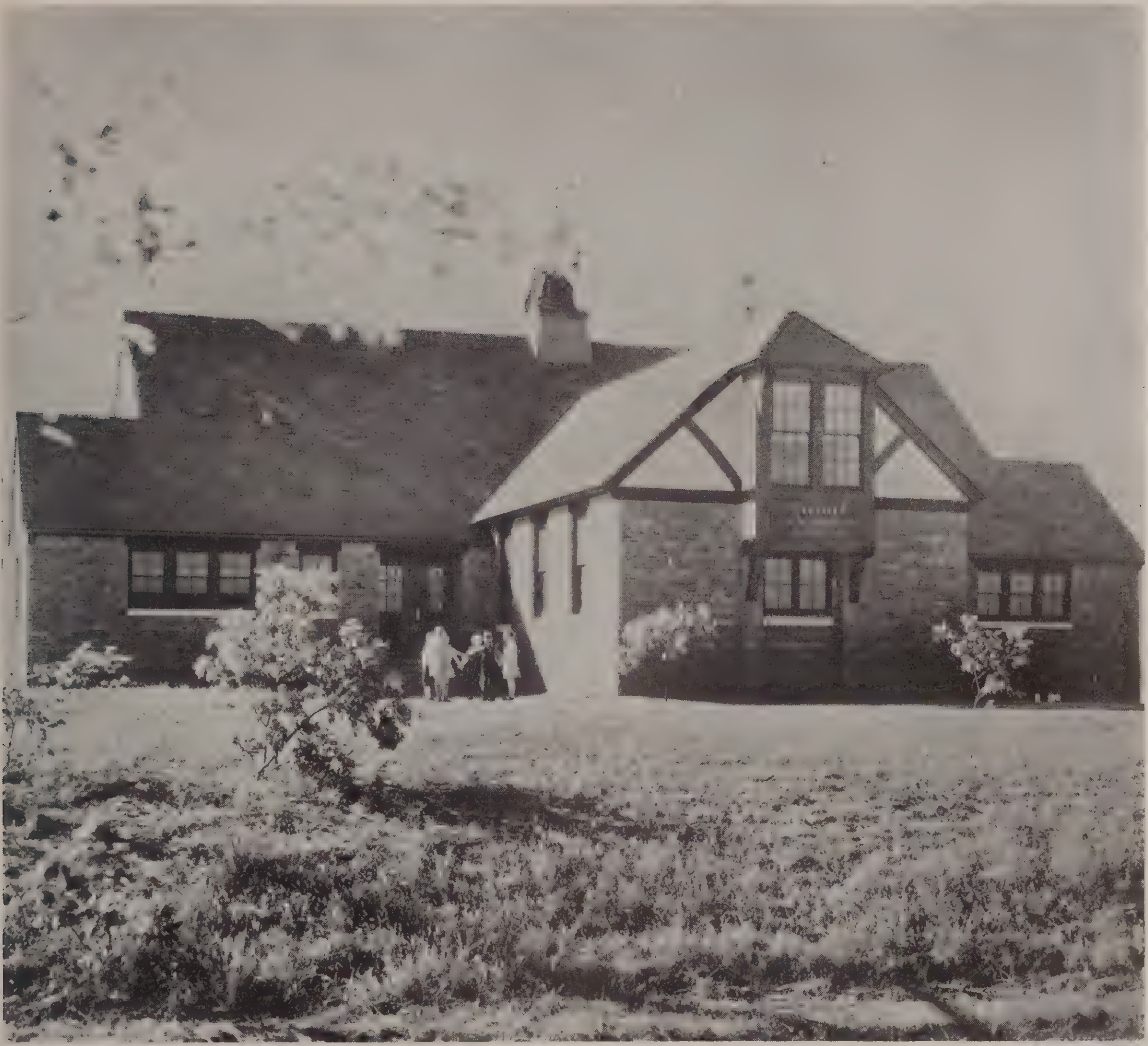

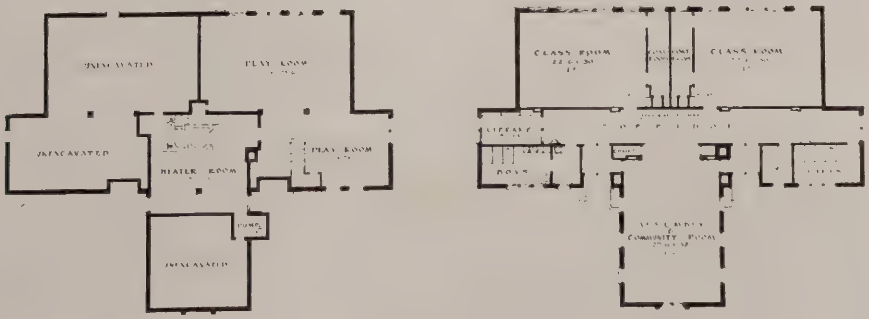

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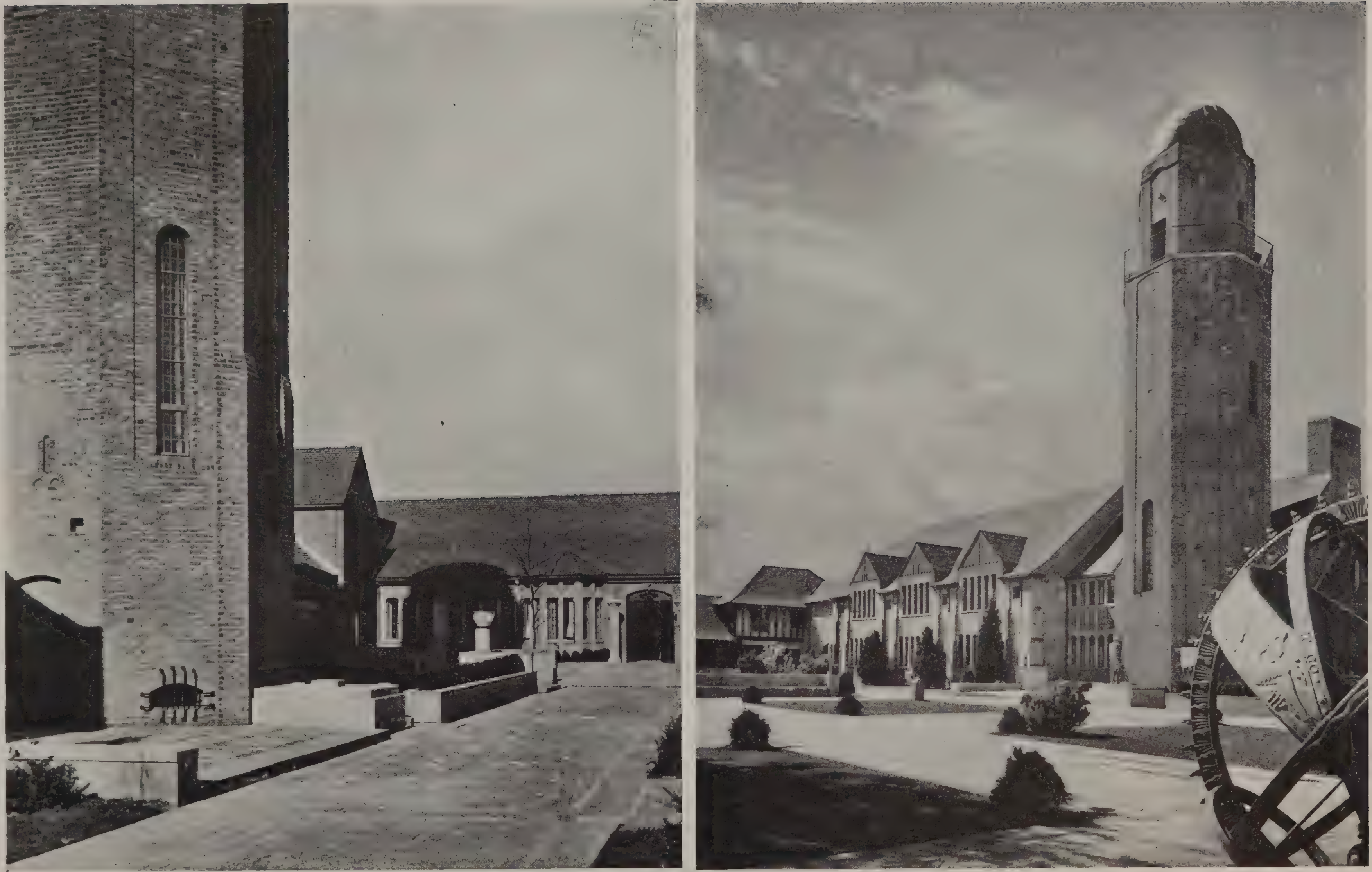

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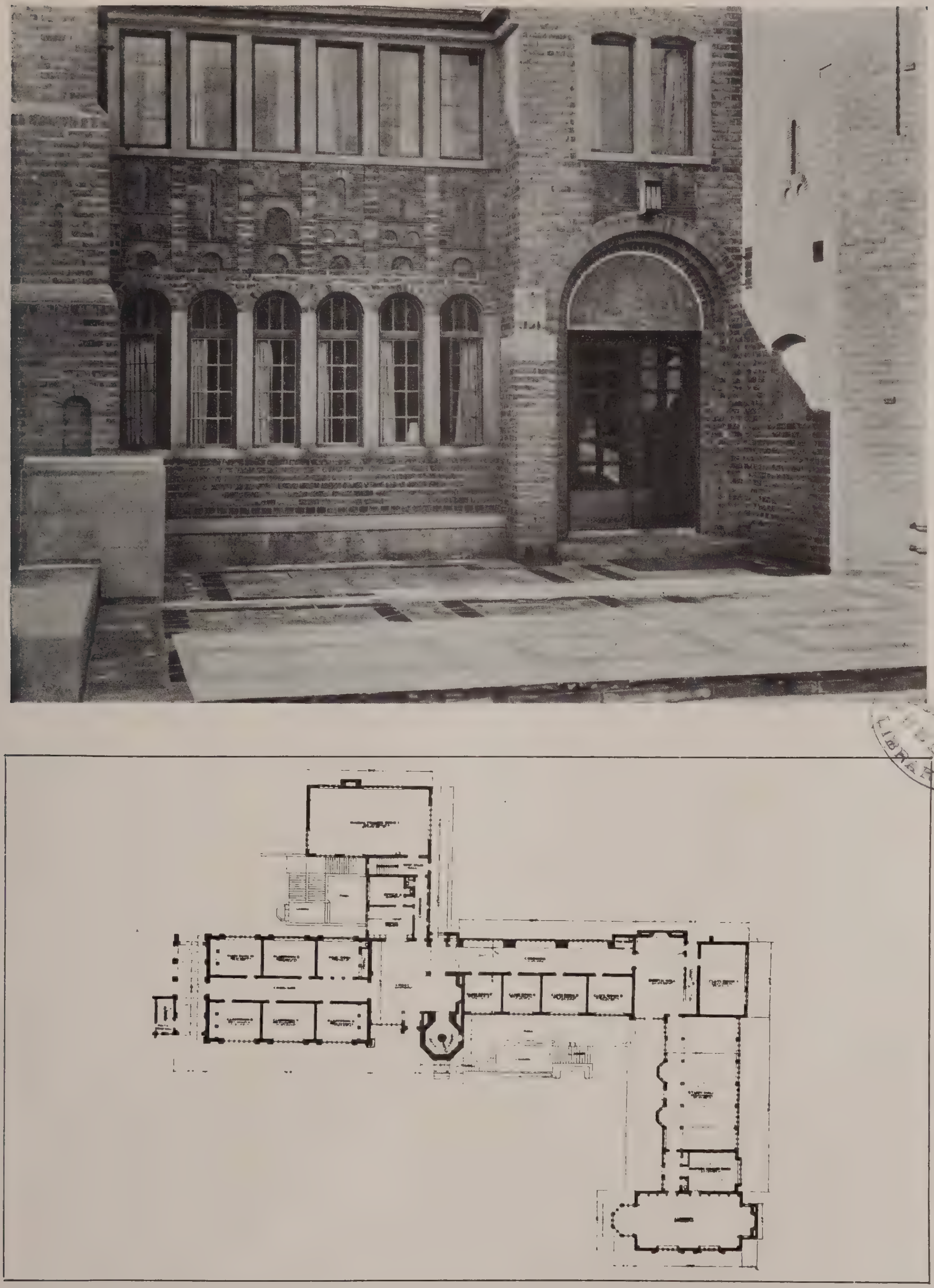

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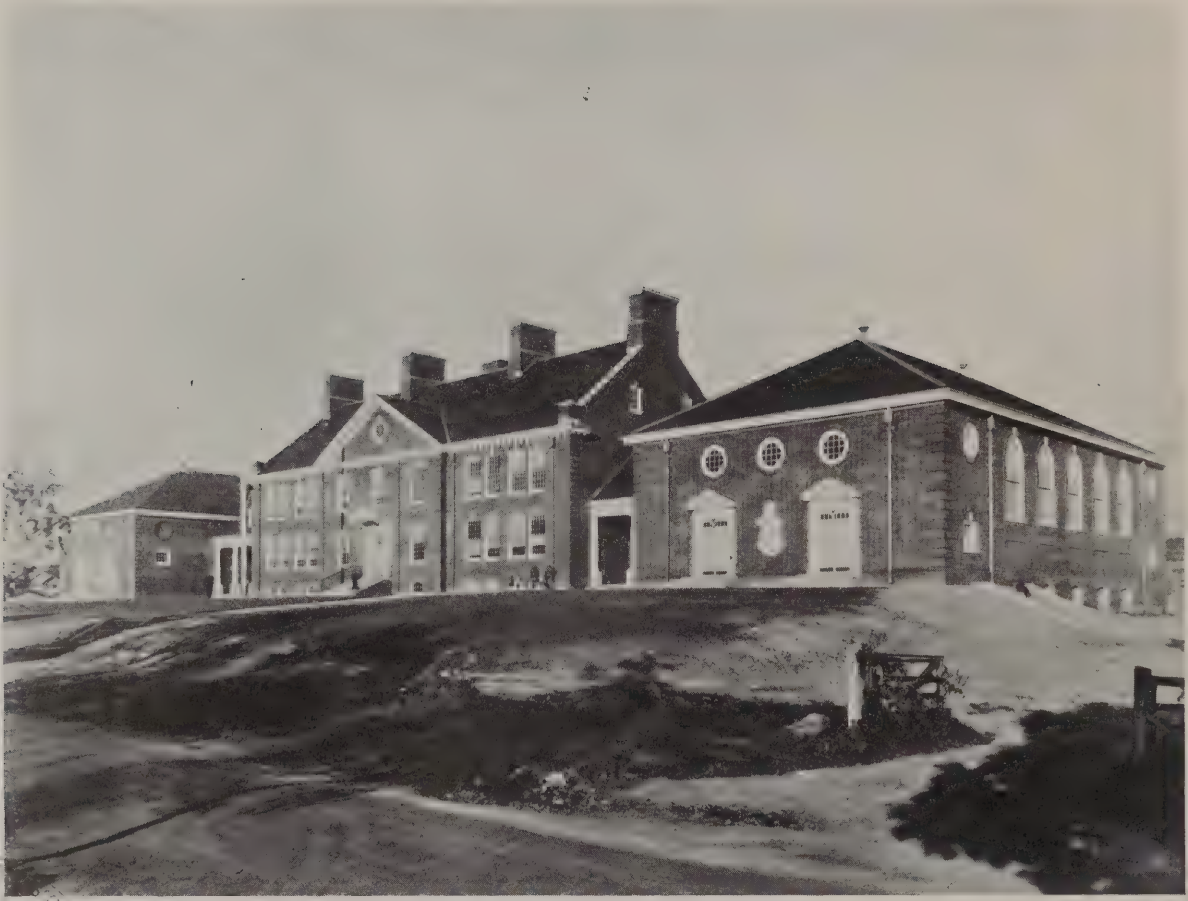

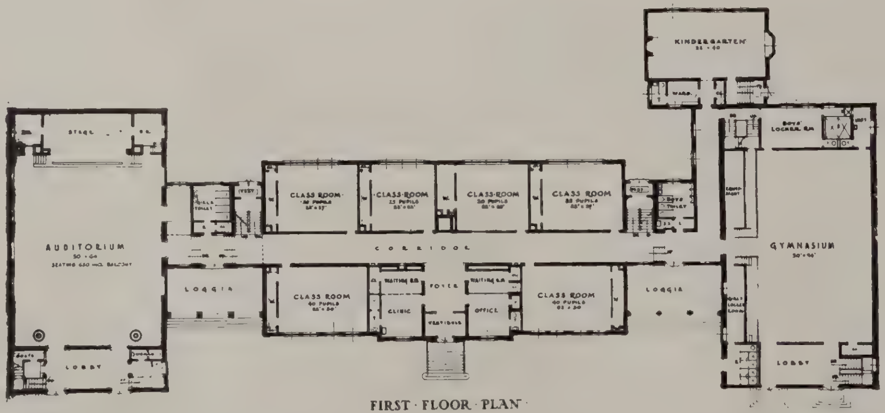

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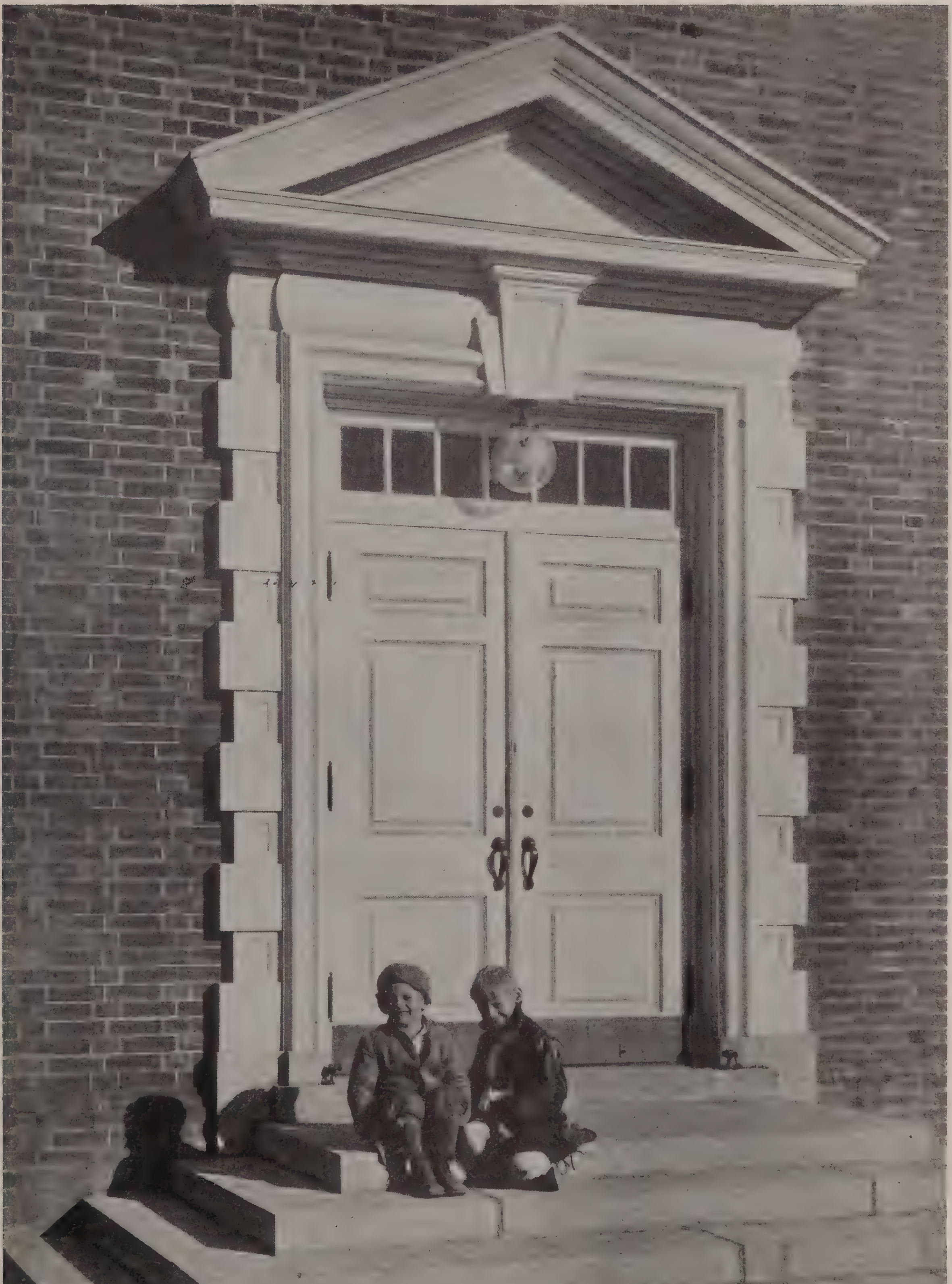

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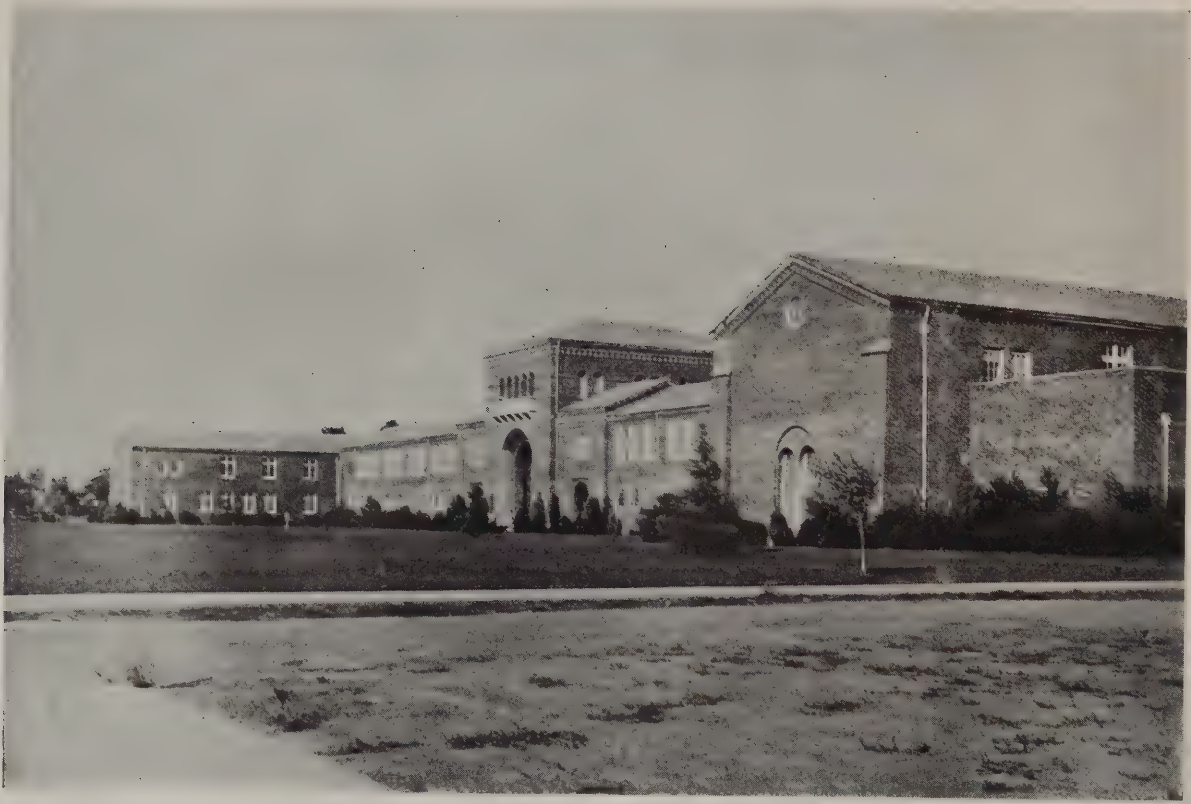

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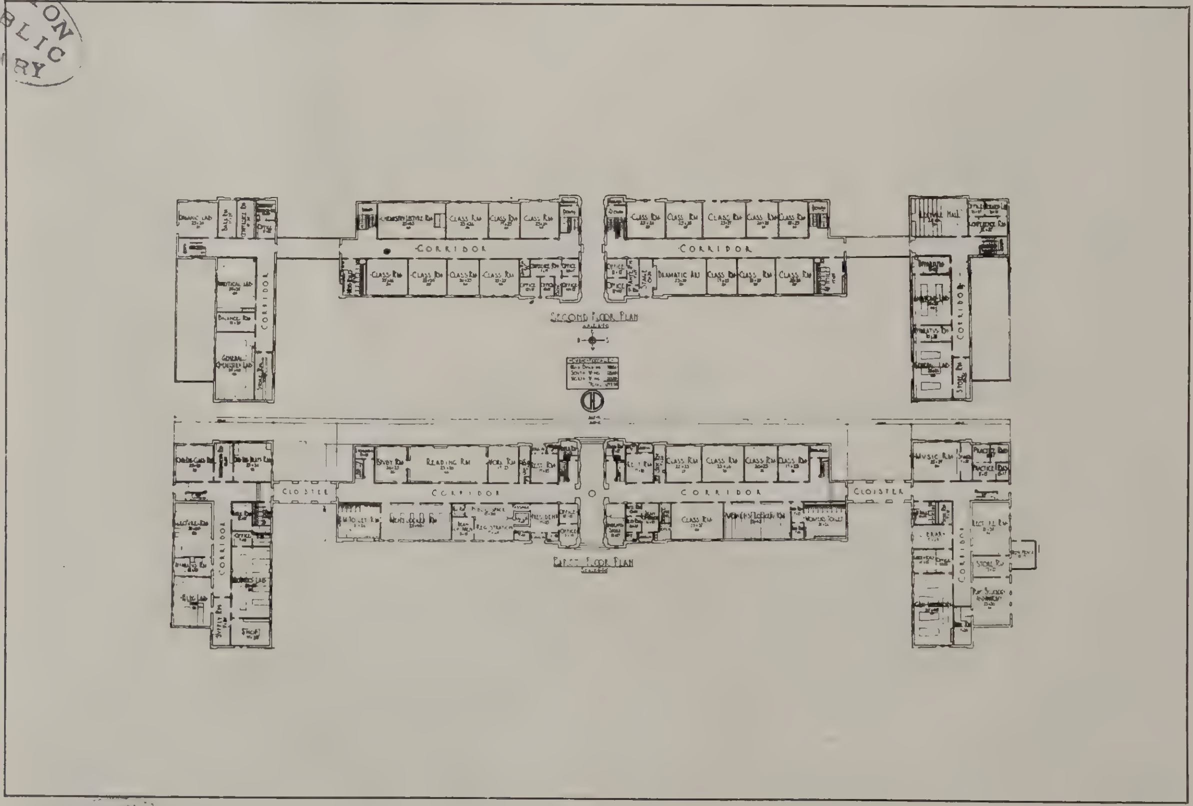

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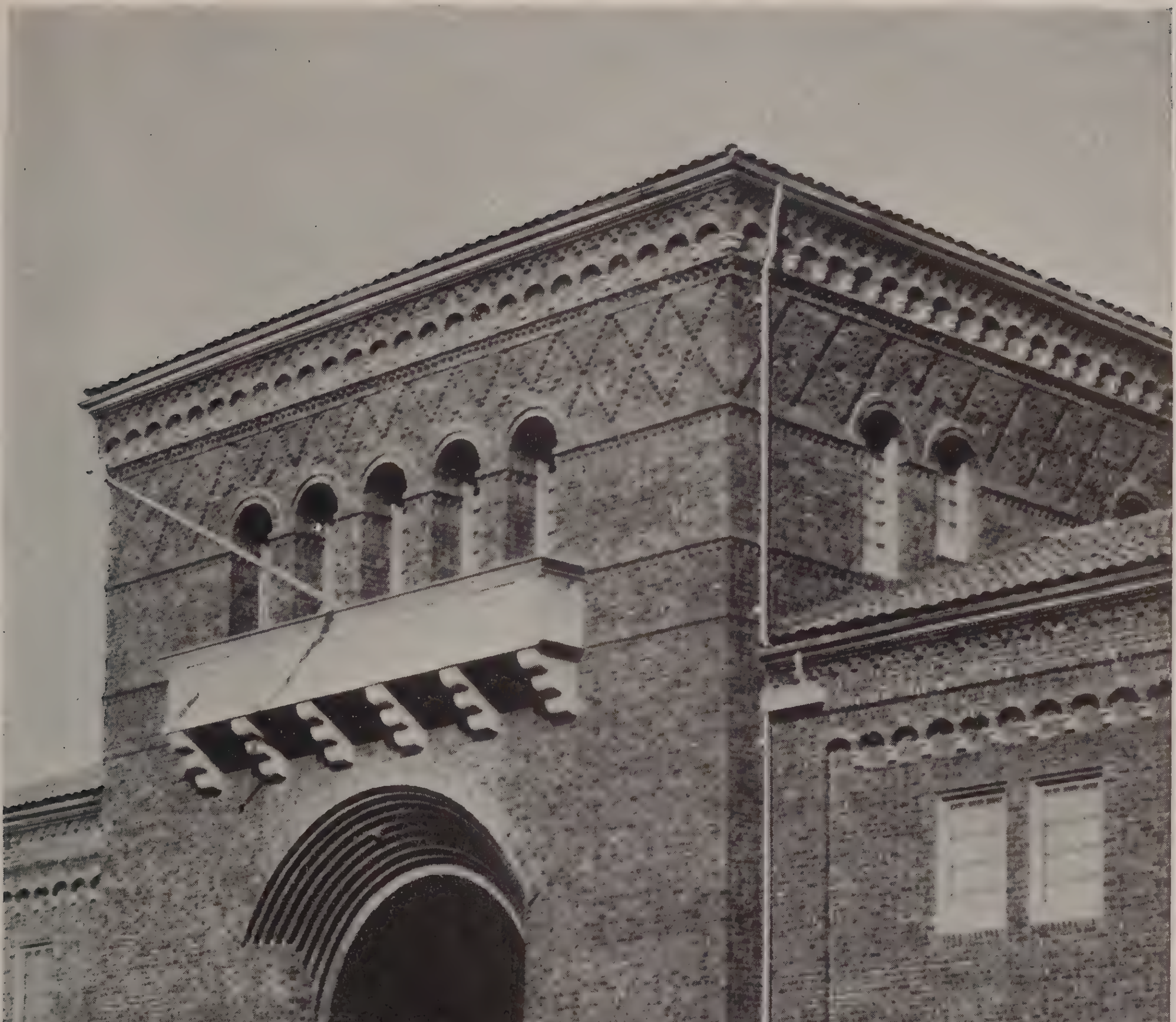

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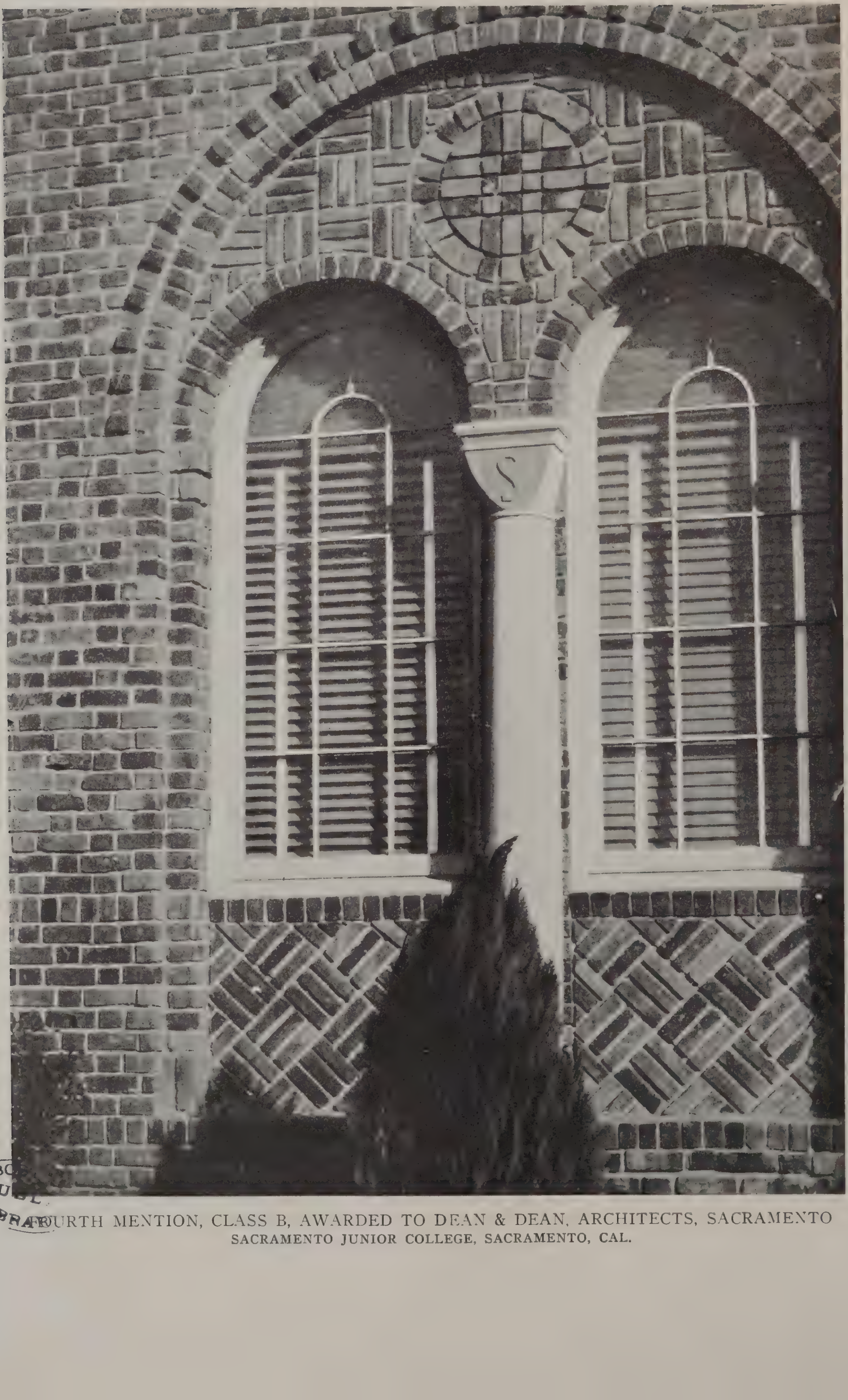

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THE MUSEUM AND THE ARCHITECT

BY

SHEPARD VOGELGESANG

NO phrase better than "The Architect and the Industrial Arts" could have been devised to advertise the current showing at the Metropolitan Museum. A useful combination is suggested, a rare opportunity created, and everyone is invited to come and say what of it. Placed for once before the public in the light of an organizer of industrial products rather than a sort of milliner, the architect has been given a function which the public imagination should be ready to grasp. The combination suggests a tangible service which should appeal directly to American business instincts. Too little emphasis has been placed heretofore on that phase of the architect's service which differentiates it from the performance of the painter or sculptor,—on the architect's utter dependence upon steel contractors, bricklayers, and fixture manufacturers to realize his conception. The quality and character of his work depend upon the quality and character of a multitude of contributing industries. In a sense, the architect is the arbiter and interpreter of public demand in these things. He is thus indirectly responsible for much that is good or bad in the building industry. By calling in seven architects to provide backgrounds for furnishings, either designed by them or selected under their supervision, the Museum has gone further than establishing a sort of leadership for the architect.

The Exhibition follows the European closely in one respect. There are few stock articles in it. One wonders whether all of the commercial articles produced in this country are so much worse than those designed specially for it,—how the Exhibition would have appeared had the architects been called not to design the exhibition but merely to assemble it. America is justly proud of her technical achievements. It would be interesting to see how much æsthetic justification exists for this pride. In designing for quantity production rather than for hand execution, a difference between American and European procedure appears. To the European, machines and technical equipment constitute an extension of "farmer tools," the powers and limitations of which must be known to the same degree that the former artisan-designer was forced to a knowledge of his simpler equipment. The American designs, and he trusts that a method of producing his work exists or will be called into being for the sake of its production. If the American is so fortunate as to hit upon a commodity which the public wants, machines, no matter how complicated, will be developed to execute his idea. In practical production his hope is often realized, but the extension of such faith to matters of mere appearance of design is over-optimistic. While encouraging a rapid technical development in this country, the arbitrary attitude of the designer toward the machine perpetrates absurdities and increases waste. No sooner is machinery developed to turn a Jacobean spindle than spindles are declared obsolete and ridiculous, and all furniture must be plain of surface and rich with veneer; machines made for turning spindles lie idle, and the manufacturer invests hopefully in appliances for new tricks in veneer. The man who knows his tools is generally not the architect or any other agency of fashion, but the manufacturer. If the architect contents himself for a time with acquainting himself with already developed techniques rather than with involving the manufacturer in further complications, the service rendered to art and economy will be more steady progress. The manufacturer and the structural engineer should bear an equal and honored relationship to the architectural profession. The best architectural and designing training would not consist of devising pomposities of embellishment and impositions on technical processes, but would be an apprenticeship in the trades allied to architecture, followed by artistic education. Such a theory is by no means new, but its practice would indeed be a novelty. The foremost central European schools already obtain students trained at least in the handicrafts.

It is perhaps a misfortune that an exhibition in a Museum demands in the public's, as well as in the architect's imagination, luxury and ostentation. Progress would be more certain,—more soundly based,—in an exhibition of actual housing solutions,—model one- or two-room apartments fitted up with the utmost convenience and comfort. The public should be able to enter such an exhibit, pull out the drawers, sit in the chairs, turn the taps. It should be invited to give written comments and criticism. It should be able to come into contact with modern design, not be expected to stand behind a rope with all the distant, inappropriate beauty of the past behind it and to express appreciation of a new beauty, the meaning of which it has not learned to understand. If modern art in this democracy is to develop, it must itself be democratic. If it is to develop not as a joke played upon machinery but as a functioning reality, it must appeal to a class which cannot afford whims, but rather to a class of people to whom *use* not *mode* is important.

IN THE INTEREST OF ARCHITECTURAL DESIGN

BY

GEORGE MALCOLM BEAL

THE growing demand for competent architectural designers puts a heavy burden on the educational world, for it is from the schools of architecture that the artists of tomorrow will come. The converging lines of force that are pressing on toward securing a more complete and unified expression in architecture will either be brought closer together or diverted by future designers. When we look to the source of supply, there is need to reflect and question. Are the design courses in general use throughout our land conducive to developing the proper thought processes that will continue to expand or will they limit thought and encourage plagiarism?

Taking in general this program to be typical of the outline of study in the majority of schools over the country, let us consider it. In order to prepare properly for the study of analytique work, the first year is usually given over to the study of the orders. This is followed by the application of the orders in analytique design, which is in the main two-dimensional composition. Then come small compositions in the three dimensions, constituting a study of separate buildings. Finally the larger compositions, which are necessarily at a smaller scale, are given. Thus, for the most part, the student is led in his study of architectural composition from details of the orders into the study of detailed areas, then to mass composition with smaller scale detail, and finally into larger compositions with the least precision of architectural ornament.

Why not teach our future designers, from the very beginning, in a logical progression? Why throw to the student, to copy in a limited time, detail which he does not comprehend and therefore with which he only goes through the mechanical process of reproduction? Training in the ability to draw what one sees is good, but what about forcing the student to think, if he gives any thought, to the details of a style he does not understand? For details are not the first thing considered by any well trained designer. Often the study of architectural history with its emphasis on the different styles, is not commenced until after the student has passed his first year of blindly copying the orders.

After very carefully forcing our students to think details for a year or two, we ask, hope and even expect them to loosen up and portray to us a spirit of space harmony, with little thought to detail, in the form of a sketch problem. Then we wonder why such poor results are turned in on these short problems, which should convey well proportioned ideas and not precision of detail. Are we not somewhat to blame for this, by confusing the mind of the young student with over-attention to ornament?

There are many problems connected with the teaching of architectural design, but these, I believe, can be corrected to a large extent if the proper thought and attention be given. All too often, the student commencing the course is unable to express himself at all in free-hand drawing and does not know how to use instruments. This, after only four years of study in which knowledge of many other subjects must be gained, puts a severe burden on the shoulders of the teaching profession, if it is to turn out men who have the fundamentals of design and the ability to express themselves thoughtfully. Very often the student, in order to gain recognition for himself and uphold the standard of the school, puts in night after night concentrating on design, neglecting other subjects and narrowing his life outlook. The ability to see life through a broad and noble vision is no small aid to the designer, and it should not be left uncultivated. Lengthening the period of architectural study to five years is a help, but does not solve the problem.

In referring to ornament, Claude Bragdon says: "At present this need is met by universal and unashamed copying of the past; the library and the museum are the places from which all the little pitchers are filled with these stale waters instead of from the creative imagination whence wells up the Water of Life." Do we not need a revision of our design courses so that the student's mind may be cleared of too early an attention to detail before a spirit of feeling for mass and area has been acquired? Larger problems, with little attention to detail, which embody the principles of composition in mass, area and to some extent line, might well be given first. Isometric drawing might be used to advantage in arranging proportion in volume and mass until an understanding of perspective could be gained. By working from the large compositions, especially in plan, to smaller problems of separate buildings without details,—perhaps expressing the building in plan and mass only, with the fenestration merely openings through the wall,—then moving on to two-dimensional detail studies in elevation, the mind of the student would not be confused. It would be aided in thinking of space relations and would gain a feeling for proportion which would then be carried into the details. This would also allow time for a more thorough understanding of the development of styles and for gaining knowledge of ornament.

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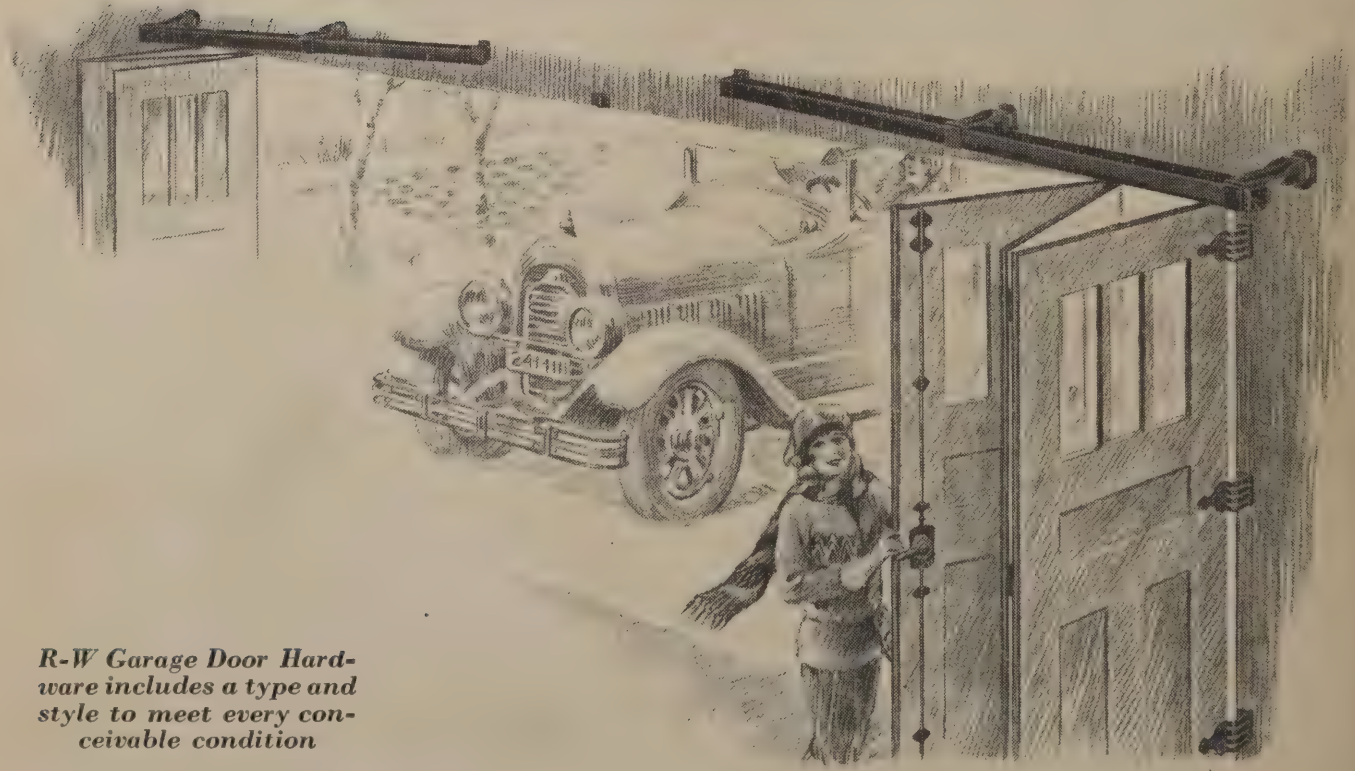

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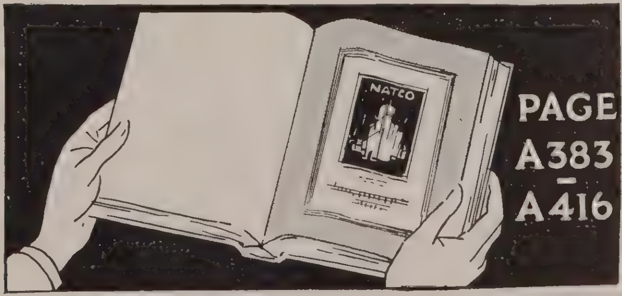

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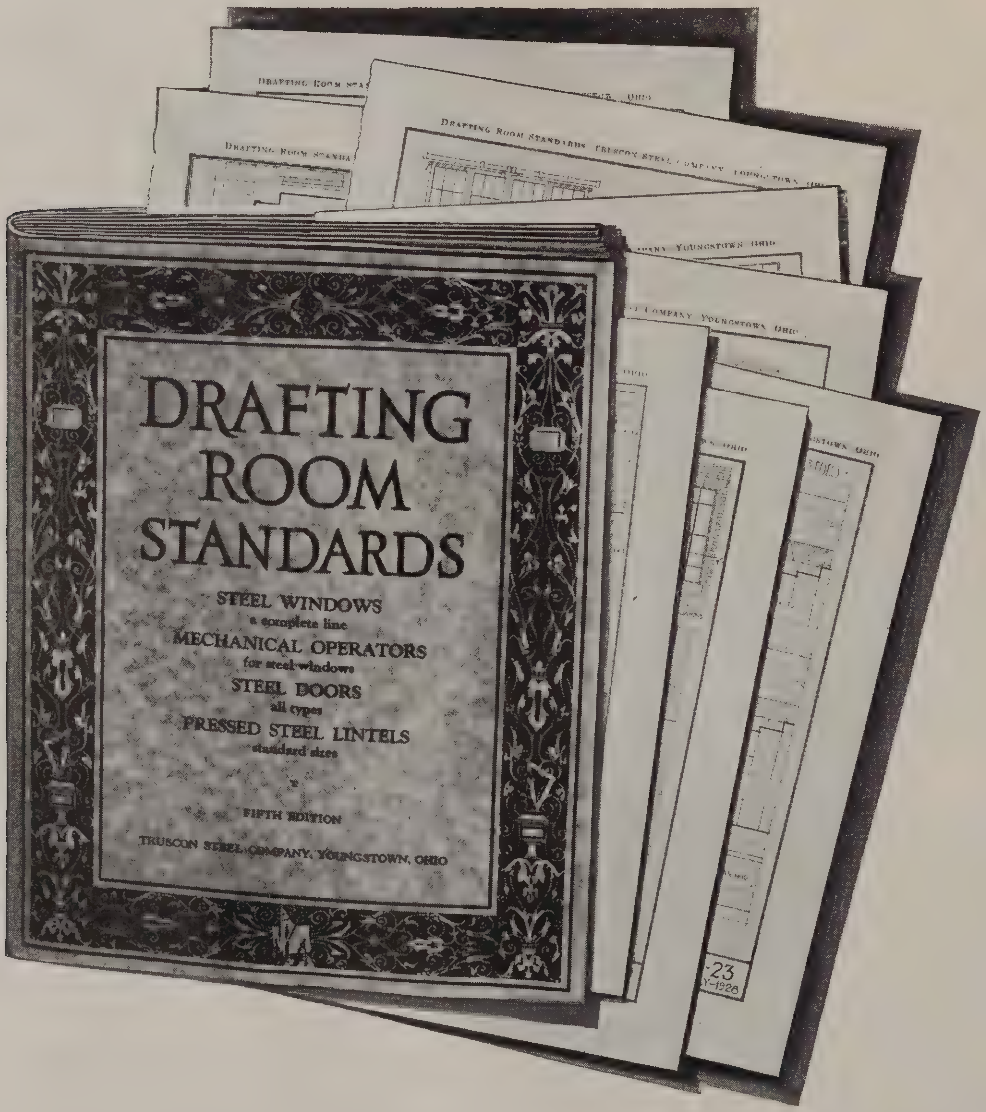

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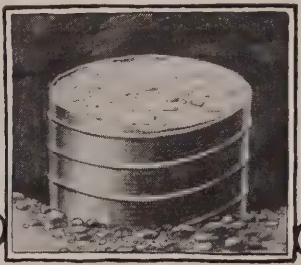

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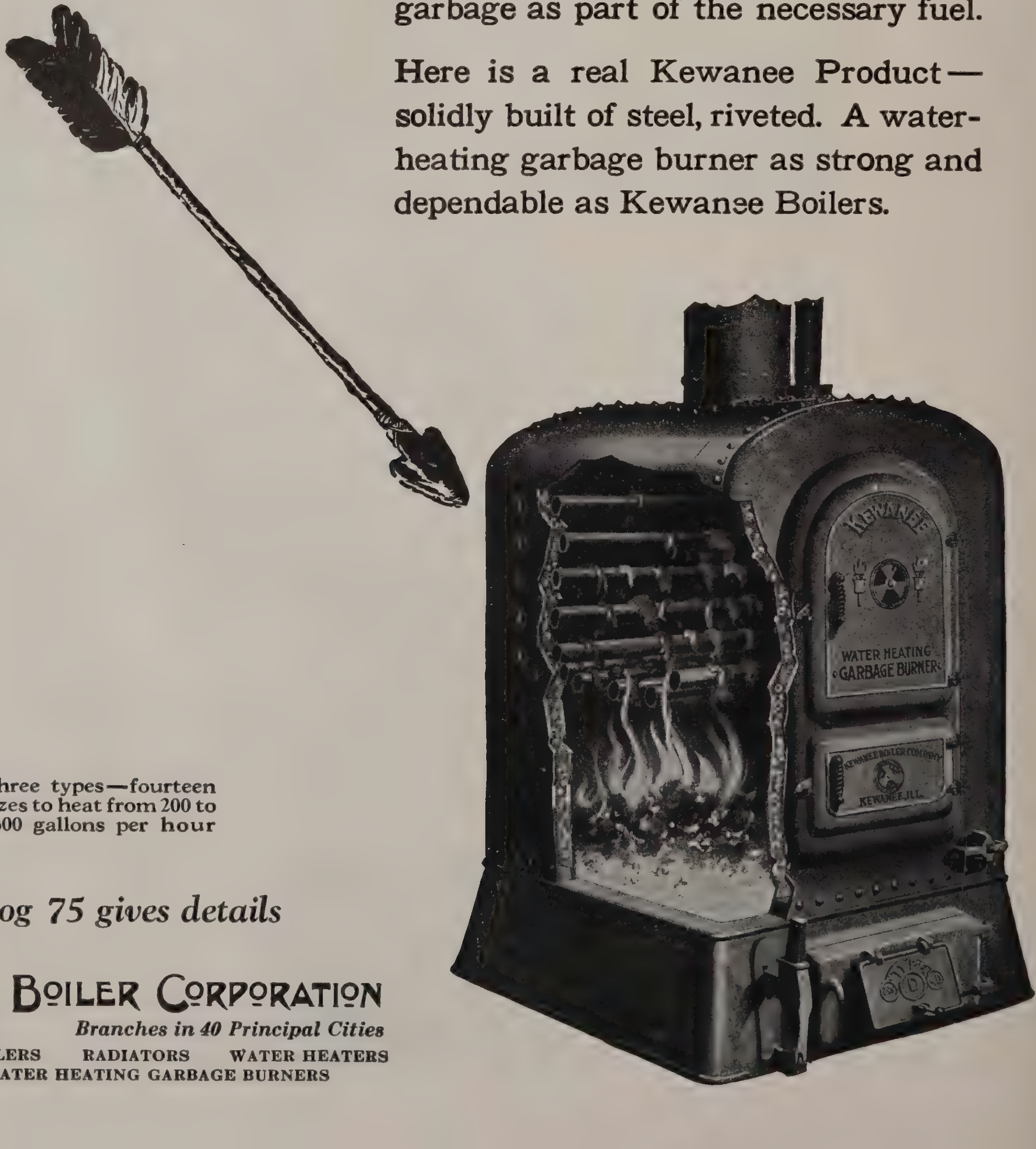

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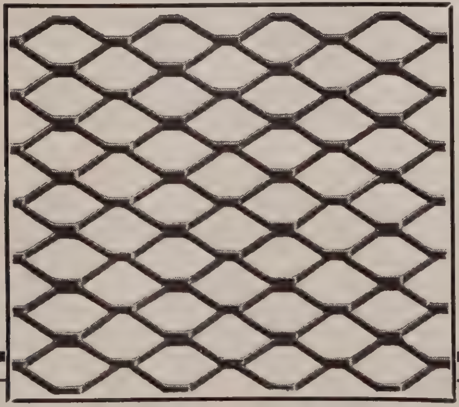

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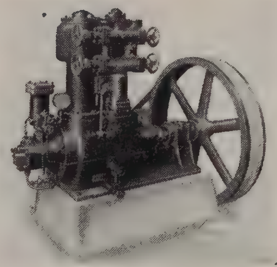

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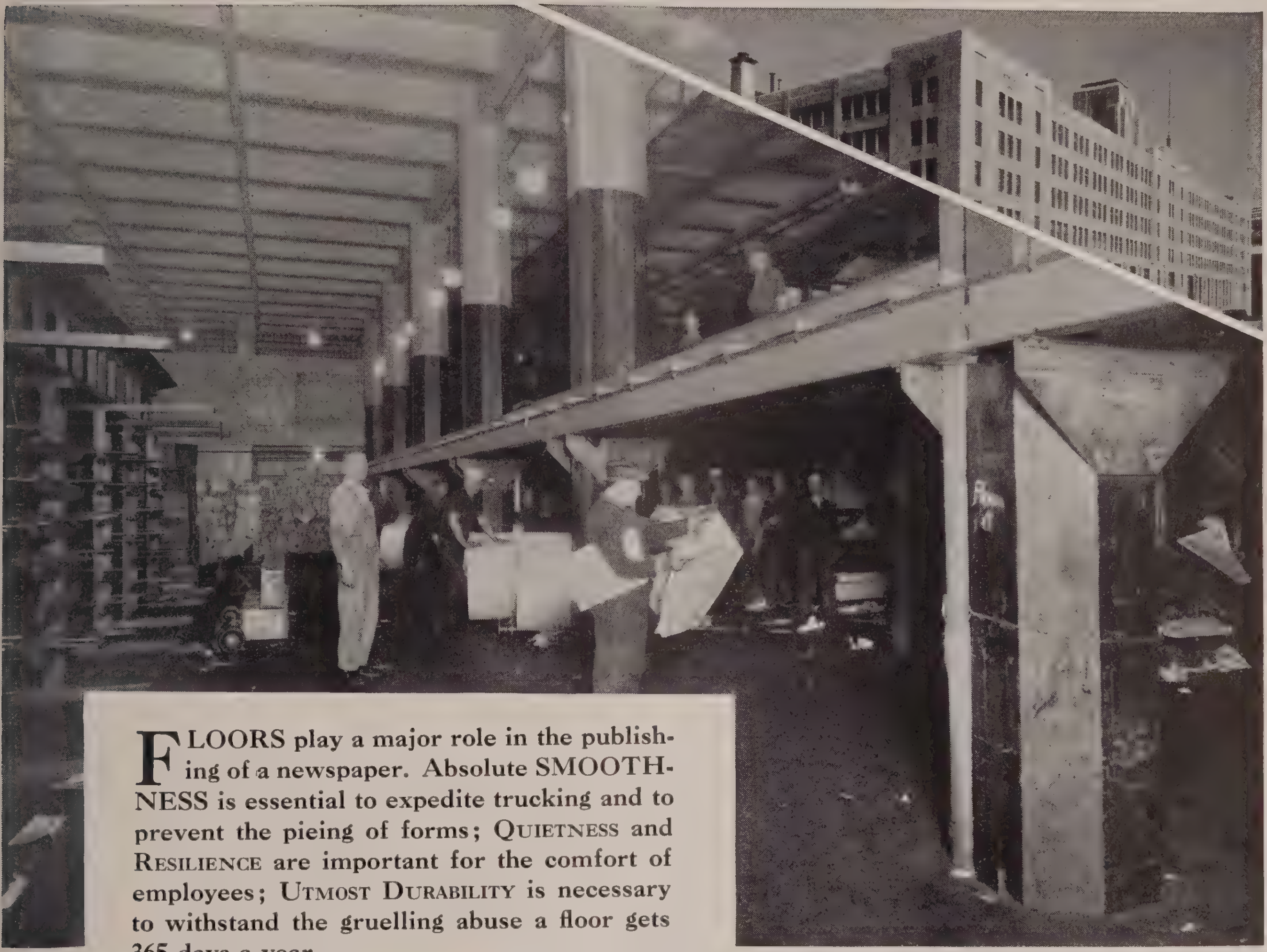

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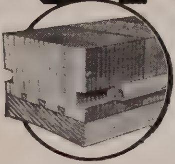

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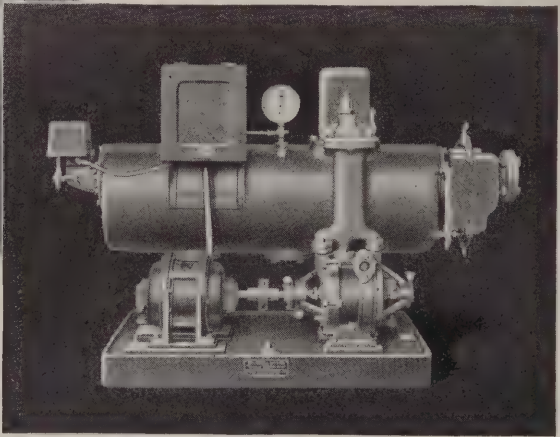

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BOOK DEPARTMENT

"THE FERRO-CONCRETE STYLE"

A REVIEW BY

CLIFFORD WAYNE SPENCER

IF the new style of architecture which is undoubtedly now in the process of development is to have a permanent place in the annals of architectural history, it is evident that it will have to be known by some less transitory and more descriptive name than any of those now in general use. In centuries to come it will doubtless seem highly incongruous to speak of a style of architecture developed in the first half of the twentieth century as the "modernistic" or "contemporary" style. In choosing a definite and permanent name for this type there is much to be said in favor of calling it "the ferro-concrete style," since it is largely by the use of this combination of materials that the new effects are made possible. All the great traditional styles of architecture have had their inception immediately following the discovery of new materials or of new methods in the use of materials which were old. By the use of iron and steel in connection with concrete the chief structural limitation of the traditional styles has been overcome,—that of not being able to build extensively in the third dimension. Due to the nature of materials available, it was necessary to build vertically,—one stone or one brick above another, so that all the emphasis was necessarily placed on the vertical treatment. Now, however, by the use of reinforced concrete it is possible to extend unsupported members horizontally for much greater distances, and since all good design must conform to construction possibilities, an entirely new field in architectural design is thus opened up. The ability of modern engineering science to ascertain accurately the supporting power of structural members affords unlimited opportunities to the present-day designer.

The slowness of architects, especially in this country, to take advantage of these opportunities is probably due to a rather general, erroneous belief that concrete is not adaptable to æsthetic treatment in design. The book entitled "The Ferro-Concrete Style," by Francis S. Onderdonk, should do much in correcting this mistaken opinion, since merely to glance at the illustrations is enough to impress one with the fact that so far as form is concerned, use of reinforced concrete has no limits. This fact is brought out by illustrations of such remarkable examples as a garden statuette showing a gracefully poised figure, with wings, rendered in concrete and steel, and another illustration showing a pavilion suspended in mid-air with no means of support other than the stairway leading up to it. The author points out that it is generally true that those living at the times of great achievements remained ignorant of their advent, and that the general public, as well as the majority of architects, do not now realize that we are witnessing the birth of a new architecture, and that the false opinion in the minds of many as to the design possibilities of concrete is due to the habit of considering the limitations of concrete design as identical with those of wood form construction. As a matter of fact, using wood centering is only one of many ways of shaping concrete, and many of the others are much more suitable from a design point of view. One of the valuable features of the work is that while the design possibilities are given greatest importance, the text matter gives much technical and practical information as to the up-to-date methods of handling this adaptable material.

The author of the work was born in New York, but he spent 20 years of his life in Europe, where he received his architectural training and devoted much time to investigating the possibilities of ferro-concrete architecture. He is now a member of the faculty of the College of Architecture of the University of Michigan, so it may be said that his viewpoint is international, which adds greatly to the interest and value of the work. France, the country in which Gothic architecture had its greatest development, seems to have taken the lead in using the new style of design, and the examples of ferro-concrete work found there and in Germany, as well as in some of the other continental states, are generally much more advanced than those found in America, although a great deal has been done in the Pacific coast region. True, a great deal of the so-called modern work is trashy and has been done by those who have not sufficient background to do good work in any material, and yet there are plenty of good examples to point the way to a rational development and to show the possibilities latent in the style. Many of the illustrations in this volume are chosen with a view to showing that which is bad as well as what is worthwhile, and the text explanation as to why certain things constitute poor design will give a good basis for developing an appreciation of the good in this new architectural style.

Perhaps the two most characteristic features of the ferro-concrete style as yet developed, and features that are destined to play a most important part in its future development, are the use of concrete tracery and the parabolic arch. Concrete tracery has been used considerably both on our own Pacific coast and in Europe, and it offers a great many new possibilities in the decorative treatment of wall surfaces. The tracery is formed of reinforced concrete in an unlimited variety of pattern, and the apertures are often filled with glass, thus taking the place of windows and achieving very beautiful effects both in the daytime and at night when they are lighted from within. This concrete tracery is being used in residence work as well as in more monumental buildings such as the Bahai Temple at Wilmette, Ill., which is to

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have a dome formed completely of concrete tracery. The use of concrete tracery will enable the architect to "fulfill his supreme duty to create poetry and tell stories in stone" much more readily than ever before. Wall surfaces treated in this way can be made as decorative or as simple as may be desired without losing any of their structural soundness. The record characteristic feature of the ferro-concrete style which is stressed by Mr. Onderdonk is the beautiful parabolic arch. Reinforced concrete structures have the advantage of being made up of one complete mass and not having reams or joints as is the case with other materials where columns or walls are laid up and the intervening spaces spanned by horizontal members or arches of very limited extent. In the new designs, arches based on the parabola, nearly vertical at the base and curving gradually more and more till at the top it approaches a semi-circle, permit of vastly greater unimpeded floor areas, and produce buildings of great dynamic beauty. The parabolic arch is more or less familiar in bridge construction, but it has not been used extensively for buildings in this country. In Europe, however, a surprising number of important buildings have been built from designs based on the parabola. The collection of illustrations of this type of building contained in this book is very complete and well chosen, and one cannot help being inspired to a firm belief in the future of this style. In addition to being a remarkable treatise on the use of ferro-concrete architecture, this volume may be said to be one of the most complete and inspiring recent works on modern style in architecture.

THE FERRO-CONCRETE STYLE. By Francis S. Onderdonk. 265 pp., 8 x 11 ins. Price $12. Architectural Book Publishing Co., New York.

THE VILLA MADAMA. By W. E. Greenwood. 76 pp., 10 x 12¾ ins. Price $20. William Helburn, Inc., New York.

A FELLOW of the Institute of British Decorators, this author shows great fidelity to and love of his subject in his compilation on the Villa Madama, and his publisher is equally to be congratulated on producing a fine piece of book making. This volume, of some 75 pages of text, has been generously enriched with fine color reproductions, to the number of about 30 plates. It has the extraordinary advantage over most architectural studies of being, within its limited scope, exceedingly scholarly and well annotated. The full color reproductions are not only delightfully done and well reproduced, but they present a very complete synthesis of what is probably the most representative, and possibly the finest, bit of Italian Renaissance wall and interior vault decoration still existing. They will be invaluable to any architect working in that style.

Mr. Greenwood has evidently made of this reconstruction a labor of love, and his text omits no detail of the subject which might for any reason be worth mentioning. In fact he precedes the introduction and historical notes with four pages of references which not only tie the Villa Madama in with the work of other students, but with other good contemporary examples. His references include the works of Vasari, and extend on down to the later German students, and the people whose imagination and genius went into this magnificent work come in for a series of illuminating notes. In his introduction, Mr. Greenwood says: "There is no doubt that the perfections we have hinted at in this work

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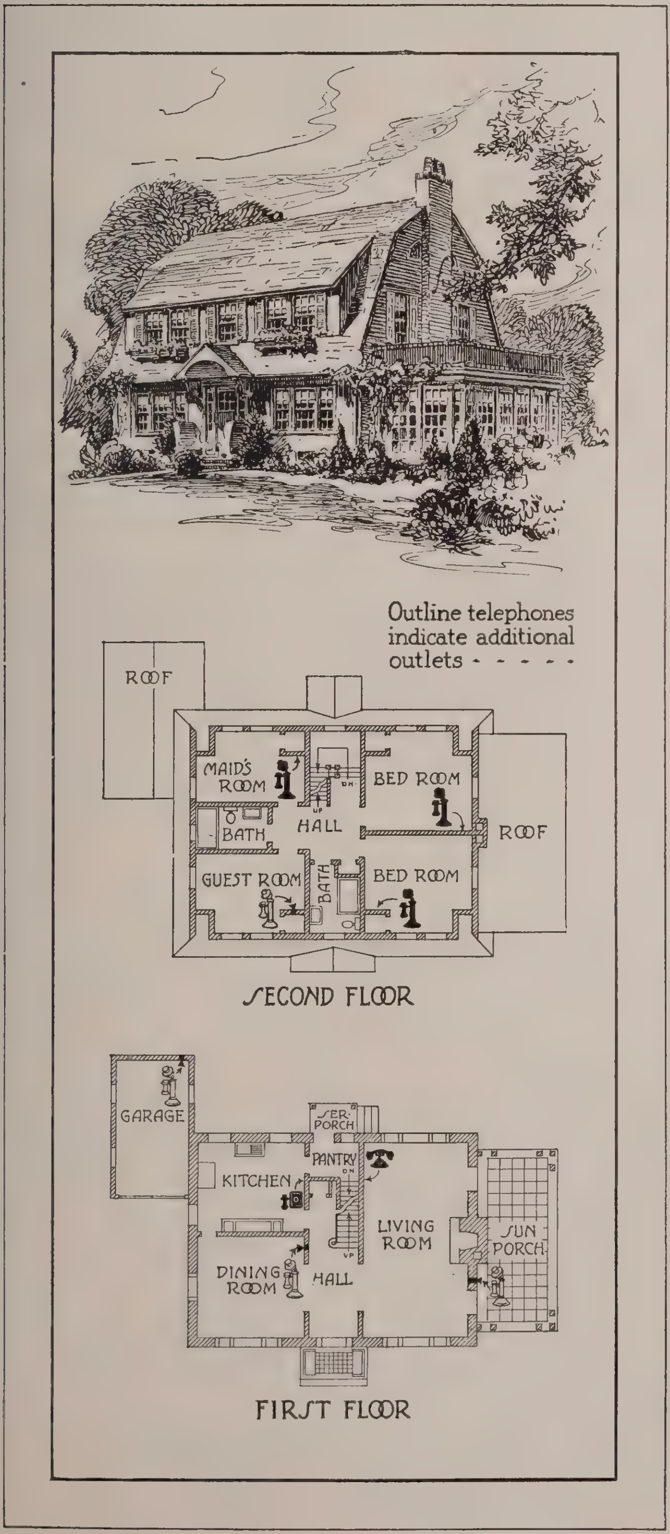

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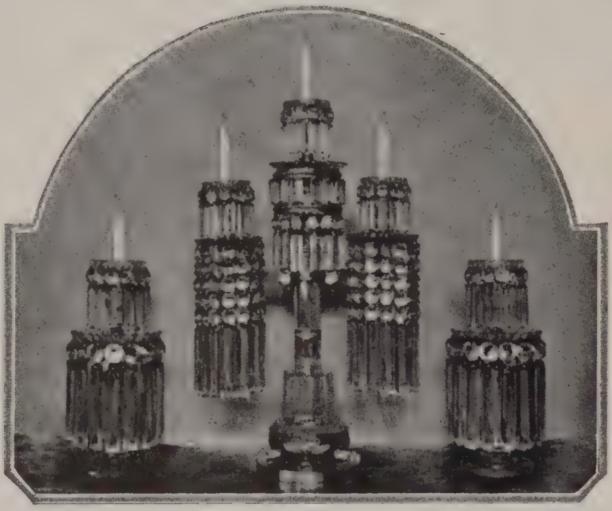

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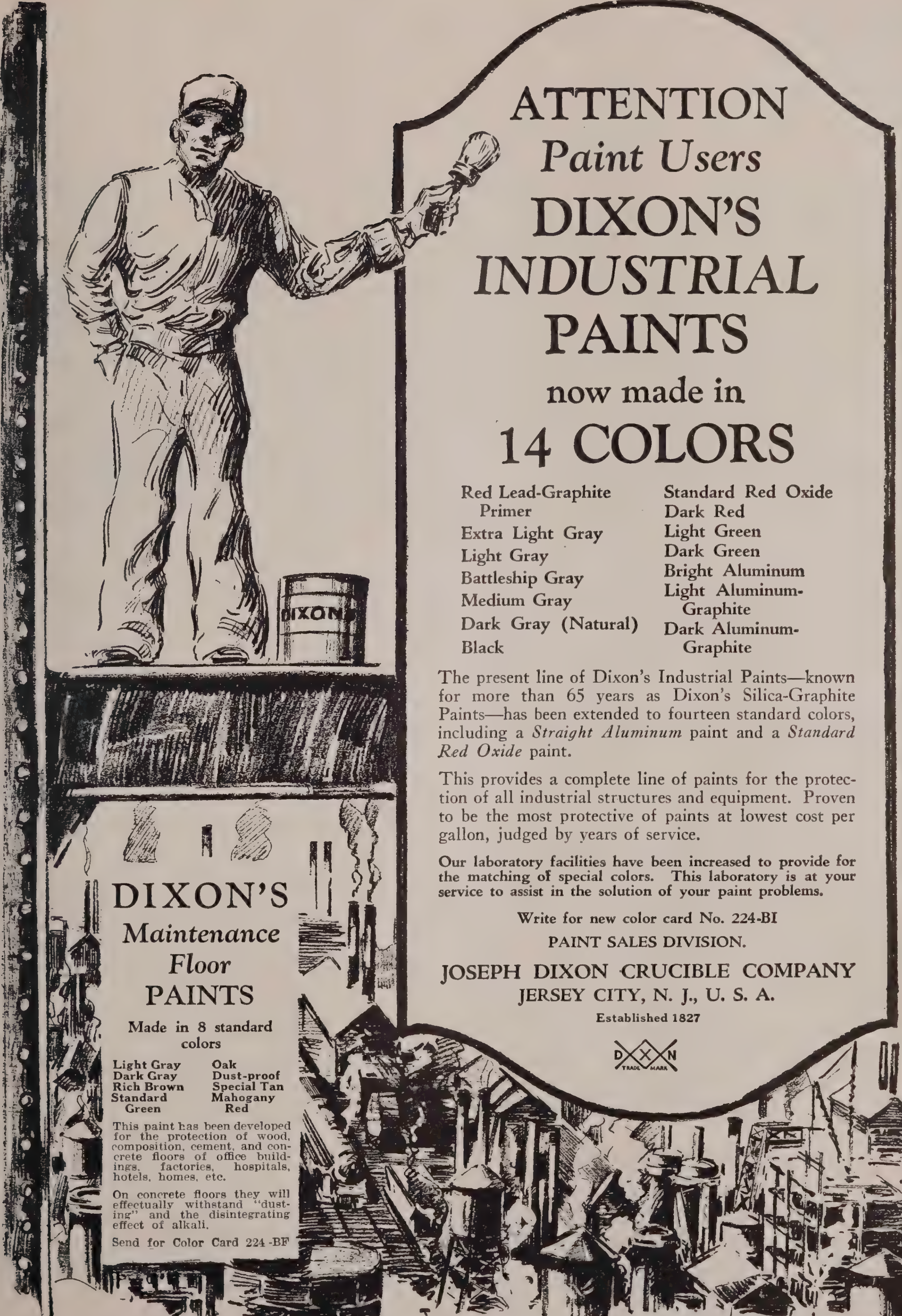
are, as examples of mural decoration, among the finest, if not the finest, in the world today. They are certainly the best of the period, that golden age of art, of which the divine Raphael was the guide and shining light. As the same artists were employed on both the Vatican Loggia and the Villa Madama, and as the work at the Villa was executed after the completion of the decorations in the Vatican, the artists had, of course, profited from their experience and perhaps from kindly criticism. We in this later age may be over-critical, but many of the criticisms that can be leveled against the Vatican decorations cannot be made against those in the Villa Madama."

Libraries of Italy and the continent which have been delved into to enrich this volume have apparently yielded some remarkable facts. In his historical notes, the author in referring to them says: "We may well surmise that, were it not for a number of original drawings and plans that have, from time to time, been identified as bearing upon its genesis and construction, the Villa Madama would have had little interest apart from its marvelous interior decoration. These drawings, few though they be, and altogther inadequate for a complete understanding of the splendid project of Cardinal Giulio de Medici, are nevertheless of untold value. For they are intimate documents bearing upon the planning and decoration of what, had it been completed, would have been the most sumptuous villa of the Italian Renaissance." It would appear that the Villa Madama may be considered not only as an almost perfect example of the Italian villa of the Renaissance, but also as the most important example of the mural paintings of that period, particularly as representing the work of Raphael and his assistants. And Mr. Greenwood has gone into these matters carefully. He notes that, "when Bramante died and Raphael was made architect of St. Peter's, two worthy assistants were given him,—men whose knowledge and talent had already been appreciated by Bramante. These two were Giuliano San Gallo and Fra Giocondo. As a matter of fact, Raphael had several talented architects around him besides these, not the least being Antonio and Aristotile San Gallo. It was in 1516 that Antonio San Gallo joined him. As this was the date when, so far as we can ascertain, the Villa Madama was first projected, and a large plan of the Villa designed by Antonio has been identified at the Uffizi, we need have no hesitation in affirming that, while Raphael may have inspired the first designs for the Villa and watched the work closely, it is to Antonio San Gallo that we must give the honor as its architect. From other plans existing in the Uffizi we know that we must also add the names of Battista and of Antonio, the younger. From 1516 to 1521 the work proceeded, and though only a part of the project as originally planned by San Gallo was actually completed, the plan seems to have been followed so closely that, as Clausse says, 'the architect who was the author must have also superintended the execution.'"

And Mr. Greenwood is not without his prophetic vein. He is particularly pertinent, in this reviewer's estimation, where he calls attention to the inconsistency in our great architecture of today in the lack of application of correspondingly great mural treatment therein. It is difficult to wholly agree with the author where he says "we need a greater demand for mural decoration to give



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stimulus to artists and to arouse their latent powers." The present-day disuse of murals in our buildings has its cause rooted in something deeper. What we do need today is perhaps, first of all, architects with a feeling for fine and significant wall decoration. The result of their foresight and coöperation would doubtless be a healthy stimulus to the work of our contemporary painters. There is no lack of painters, but there is undoubtedly a lack of understanding, of coöperation between these men and successful architects of our period. If there are to be great murals painted to adorn the fine free spaces of our public buildings today, it is undeniably from the hands of the architects that opportunities for this work will be given,— not primarily from the hands of building committees. This in spite of the fact that there have probably been notable examples where it was the painter's initiative which created his own opportunities,—witness Raphael of Italy of the sixteenth century and Diego Rivera of Mexico today. It is unfortunately true that in present-day America the excellent work being done by a number of gifted men is not receiving proper recognition.

A reconstruction such as has been accomplished in this volume is truly stimulating. This work on the "vineyard of the pope," which received the best efforts of a Raphael and the San Gallos, will be peculiarly important to those of the architectural profession who are interested in significant wall decoration. The importance of the volume's subject matter well deserves the care with which the work has been produced. It is a volume which will delight the decorator, and its value to the architect should secure it a place in every library.

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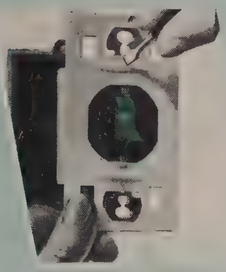

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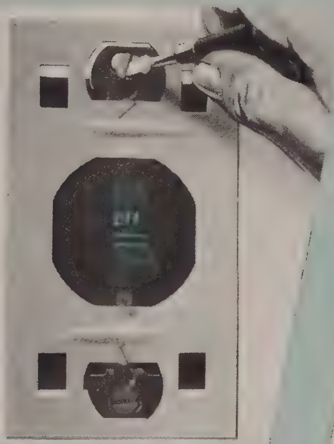

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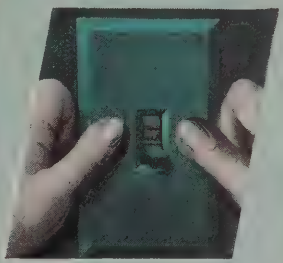

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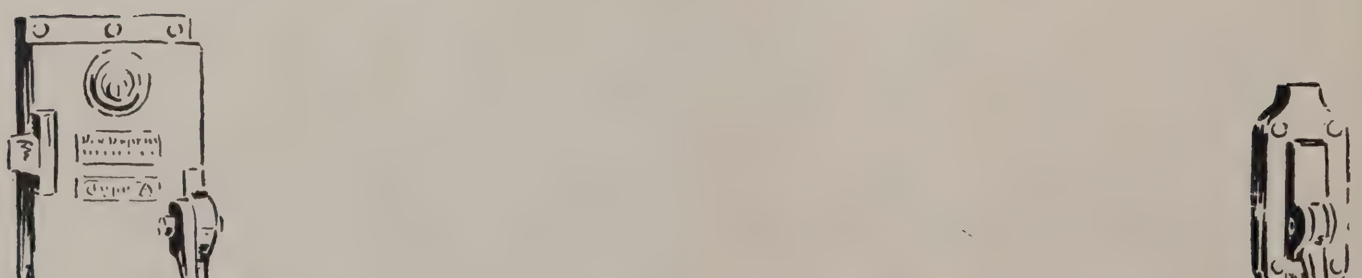

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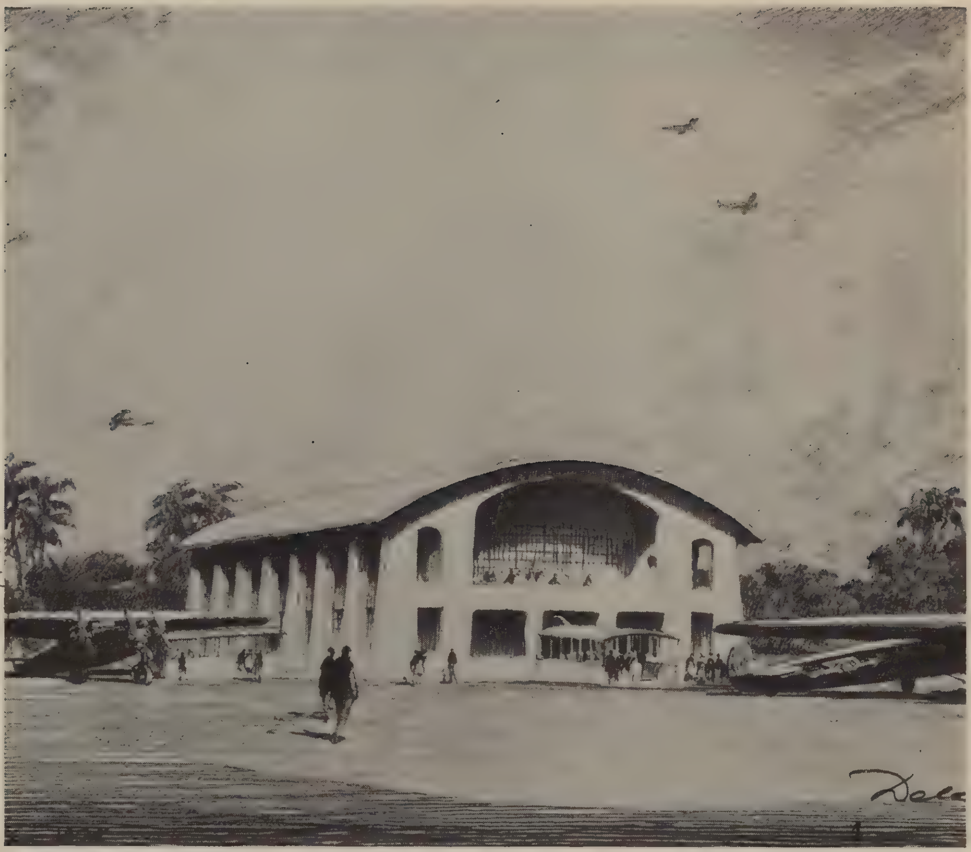

AN AIRPORT TERMINAL.
From a Drawing by Chester B. Price.

THE MIAMI PASSENGER TERMINAL OF THE PAN-AMERICAN AIRWAYS, INC.
DELANO & ALDRICH, ARCHITECTS

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AIRPORTS,—THE NEW ARCHITECTURAL OPPORTUNITY

BY

TYLER STEWART ROGERS

SO rapid has been the development of civic and commercial aëronautics that it has already reached the point where its further growth is largely dependent upon the provision of adequate ground facilities in the form of landing fields, airports, and the many types of accommodations that must be provided for the care of airplanes, pilots, passengers, and cargo. It is only within the last year or so that American cities have awakened to the fact that they must provide airports immediately if they are to benefit by the stimulation which aviation can give to commerce, industry and transportation.

In a bulletin issued in the fall of 1928,—less than six months ago,—the United States Department of Commerce listed fewer than 400 airports either completed or actually under development, exclusive of those used for military and naval forces. During an address presented before airport interests at the aviation show in New York in February, Colonel Harry H. Blee, Chief of the Airways and Airports Section of the Department of Commerce, said that there were approximately 1,000 airports then actually in use or under construction, and that about 1,000 others were being studied by chambers of commerce, municipalities and other interests with a view to selecting sites, arranging finances and otherwise preparing for active work. He qualified the statement by saying that even these figures were not reliable because they were changing daily. Estimates of the amount of money being expended in this new field are likewise vague for this same reason. Figures covering the last year and a half showed the enormous amount of $300,000,000 already spent or pledged for airport development, and a forecast was made that at least $500,000,000 would be spent in the next year and a half for such work. If these figures are out of date today, they are merely conservative, and undoubtedly a few years hence will be insignificant compared to the amount of money being expended annually for ground facilities to serve air transportation systems and the use of private aëroplanes for recreation and commuting.

Here is a vast new field of activity that involves very important problems in architecture, engineering and city planning. What have architects done to take their logical place in this new work? A recent bulletin published by the Department of Commerce lists 28 organizations or individuals rated as airport designers and constructors. Of these 28 not over four or five are architects or engineers serving in a purely professional capacity on design problems. The others are former aviators who have entered this new field or construction organizations that have seized the opportunity to capture desirable contracts of this character, and in a few instances companies that have been formed to advise professionally on airport designs, calling themselves "airport engineers." No implication is intended in this statement that the 23 or 24 organizations, exclusive of established architects and engineers, are not qualified for the work they are engaged upon; it is merely significant that so few well trained and well established architects and engineers or city planners have yet achieved recognition in this field.

Architects, engineers and city planners can and must solve America's airport problems. They are already trained for this work. They alone have the background needed to handle such operations in a constructive and farsighted manner, and they lack only an appreciation of some basic aëronautical requirements. Even these requirements are rapidly becoming public property through the dissemination of information by the Airways and Airports Section of the Department of Commerce, the National Aëronautical Association, the National Advisory Committee for

Entrance to Passenger Station, Tempelhof Field, Berlin

Modernistic Restaurant in Tempelhof Field Airport, Berlin

Aëronautics, and other organizations of like character.

There is a close parallel between the present-day development of airports and the early expansion of railway transportation systems and terminals in this country. The passenger stations and terminals that were built a half-century ago were badly designed structures, not adapted to serve the enormous expansion in railroad traffic that subsequently followed. They were designed poorly (from the present-day point of view) largely because there was little precedent for planning such structures and because few people could visualize the requirements that were subsequently imposed upon them. Within recent years hundreds of millions of dollars have been spent to revamp, reconstruct and often re-locate not only important terminals but literally thousands of minor railway stations to adapt them to modern needs.

The modern airport, like the railway station, will become a gateway to the city which it serves. It must possess dignity and quality in keeping with its important civic character. There is already a very noticeable tendency for some airport developers to create structures of more or less temporary character which will rapidly become obsolete and inadequate to meet the requirements of air traffic. In fact many of America's existing airports are comparable to a railroad terminal consisting of a round house, track yards and a freight shed which also houses the ticket office and waiting room. Out of the hundreds of millions of dollars to be expended for airport development in the immediate future, a very substantial proportion will be wasted through obsolescence if the problem is not immediately attacked in a broad way and if an effort is not made to visualize future requirements and to provide for them in the initial layout and construction of airport facilities. This has already occurred at Croydon, England, where structures which cost some $600,000 have been scrapped and replaced by modern buildings costing over a million dollars. Even the famous Tempelhof airport at Berlin, undoubtedly the finest airport in the world today, has been undergoing constant evolution for the past several years to meet the rapidly expanding air traffic of which it is the center. Comparatively few American airports have yet been carefully planned to provide for expansion at the rate already experienced by the leading European airports. Most of them have started with merely landing fields, and their structures have grown haphazardly. There is not even general consensus of opinion as to the proper method of developing American airports, and in some cases municipalities have leased parts of the landing areas they control to air transportation systems which have erected their own structures without any regard to the others or to the general utility of the field.

Such conditions are regrettable but perhaps inevitable at this stage. It is a fact that the development of commercial aëronautics has been so rapid that the ground problems which have been created have multiplied far more rapidly than they have been solved. It is essential that airport design be considered with the intelligence and foresight that has been applied to aërodynamics and the design of flying machines. Architects, engineers and city planners, trained to solve planning problems of this magnitude, must turn their attention to airports, not only for the sake of commercial and civic aëronautics but because here is a new field of business which they should logically develop.

Undoubtedly the very recent announcement of the Lehigh Airports Competition among architects and engineers for the design of a modern airport is the most significant move that has been made to bring architects, engineers, and city planners into public notice as the logical persons to guide the future development of America's airports. This competition is sponsored by the Lehigh Portland Cement Company of Allentown,

The Waiting Room in the Croydon Airport, Showing Time Indicators and Weather Map

Entrance to Airport Administrative Buildings, Croydon, England. Control Tower on Left

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Pa., which has posted $10,000 in prize money to be awarded those supplying the 14 best designs which are submitted. The competition has been planned with the utmost care and under the guidance of some 25 recognized authorities in the four fields of architecture, engineering, city planning, and aëronautics. The preliminary work which had to be accomplished in order to formulate a sound competition program is in itself of considerable interest to architects, because it was necessary to touch upon every phase of airport layout and facilities and to attempt to visualize the hitherto undeveloped possibilities for the arrangement of airport units, in order to give the competitors free rein to work out new and ingenious solutions of the problem without being hampered by the often unsatisfactory precedents which the world's existing airports now constitute. Some of these matters will be touched upon later. The competition is exceedingly timely and should prove of the utmost value to the architectural and engineering professions and to city planners, as well as to the entire aëronautics industry.

A number of people prominent in public life, including William P. Mac Cracken, Jr., Assistant Secretary of Commerce for Aëronautics; F. Trubee Davison, Assistant Secretary of War; Senator Hiram Bingham; former Postmaster General, Harry S. New; Dr. Samuel S. Stratton, President of the Massachusetts Institute of Technology; and others, have indicated their interest in this competition because of its potential value in stimulating sound airport development. In commenting on the work of the committee, Mr. Mac Cracken said:

" 'Build the bird house and the birds will come' is an old saying, but it is more true of human beings than it is of our feathered friends.

"The character and attractiveness of America's airports have a direct relation to the people's interest in the growth of air traffic, public and private. The degree to which any community can participate therein is directly in proportion to the provision which that community makes for getting airplanes in and out of the air. In other words, it means bigger and better airports and more of them. Any municipality which overlooks today's great opportunity for providing for air traffic of not only the future but of the present, will be found in the same position as those which refused to accept the railroad in pioneer days.

"The airport architecture which is being developed by the Lehigh Airports Competition will be of particular help to American municipalities in solving their airport problems. It should, therefore, command the good will of all forward-looking people."

The company in sponsoring this competition has entirely removed any possibility of there being a commercial aspect by giving the program committee and the competition management carte blanche authority to establish the requirements of the competition in whatever manner will be of the greatest value to the competitors and to municipalities, air transport companies, flying clubs, chambers of commerce, and others interested in the creation of future airports. It is a far-sighted gesture for the benefit of many interests, from which the sponsors expect no return other than added good will and prestige. Roland D. Doane, representing the company, has merely asked that the competition drawings indicate the structures as though built of Portland cement products where feasible, admitting reinforced concrete construction, concrete blocks, or stucco over other sound and permanent structural materials.

When this competition was first proposed it immediately became apparent that the program could be prepared only after a great deal of study of the character and the facilities demanded in

General View of Croydon Airport, Showing New Administrative Buildings, Control Tower and Several Hangars

a complete, well appointed airport. It was then decided to obtain the advice and counsel of leading architects, engineers, city planners, and aëronautics experts through the medium of a program committee to which would be entrusted the preparation of the competition program and subsequent oversight of the entire contest. Harvey Wiley Corbett, is general chairman of the program committee, and Francis Keally is the professional adviser. The architectural section of the committee includes Mr. Corbett as chairman, Raymond M. Hood, Professor William A. Boring, Dean of the School of Architecture, Columbia University; Parker Morse Hooper, Editor of THE ARCHITECTURAL FORUM, and Mr. Keally. Engineering matters bearing upon airport design were considered by an engineering section headed by Morris Knowles, of Pittsburgh. Other members of this section are Francis Lee Stuart, one of America's outstanding engineers specializing in port, terminal, and transportation work; Harold M. Lewis, Executive Engineer of the Regional Plan of New York and its environs; Gavin Hadden, and Colonel Willard Chevalier, Publishing Director of *Engineering News-Record*.

Airport planning is so definitely a part of city and regional planning in the relationship of airports to other transportation methods and to the communities they serve, that it was quite essential to have guidance on these problems. At the same time it was recognized that municipal, state, and county authorities are keenly interested in airport design and location. In consequence, a third section of the program committee was organized, headed by George B. Ford, city planner, as chairman. The membership of this group includes E. P. Goodrich, city planning consultant to the Chinese government, who is now in China planning airports as a means of expanding aërial transportation systems in that country in lieu of the slower and more expensive extension of the national railway system; Fred C. McLaughlin, Mayor of White Plains, N. Y., and President of the New York State Conference of Mayors and of the Westchester County Federation of Planning Boards; Samuel P. Wetherill, Jr., President of the Regional Planning Federation of the Philadelphia Tri-State District; and Harold Buttenheim, Editor of *American City*.

Necessarily, the most vital matter in the formulation of a competition program as well as in the actual designing of any airport is the need for solving practical aëronautical problems. The aëronautics section, headed by Dr. George W. Lewis, Director of the National Advisory Committee for Aëronautics, as chairman, was thus organized to secure the counsel of men representing every leading aëronautical organization as well as the practical management of commercial and municipal air terminals. The membership of this committee includes Porter Adams, Chairman of the Executive Committee, National Aëronautic Association; Major John Berry, Manager of Cleveland Municipal Airport; Colonel Harry H. Blee, Chief, Airways and Airports Section, Department of Commerce; L. K. Bell, Secretary of Aëronautical Chamber of Commerce; Colonel Paul Henderson, Vice-president, Transcontinental Air Transport, Inc.; Charles S. (Casey) Jones, President Curtiss Flying Service; Ernest Jones, Aëronautics Expert, Department of Commerce; and Harry Schwarzschild, Editor of *Airports*. The problems considered by these four sections of the competition program committee are the problems which face any architect, engineer, or city planner undertaking the design of a well equipped air terminal, and a brief discussion of the more vital matters may prove of interest.

Site Requirements for Airports

There is a universal feeling that airplanes will be so developed in the future that they can land

Hangars at the Ford Airport, Dearborn, Mich.

and take off in less space than is now required. Undoubtedly, this is true, and the progress already made, including the development of the autogyro abroad, will probably make it possible in the future to utilize less landing area than is now necessary. On the other hand, it must be remembered that there will be an equivalent expansion in the use of planes, not only for commercial transportation, but by private owners for recreation and commuting, and as this growth takes place, more planes will arrive and take off simultaneously, requiring correspondingly larger areas for maneuvering. Furthermore, it has already been demonstrated that the establishment of an airport stimulates realty values in the locality and leads to development of vacant land nearby with industrial plants associated with the aëronautical industry, with homes, and with all of the structures which naturally congregate around any center of transportation, such as hotels, stores, and amusement places. Thus, when the boundary of an airport site is once established, it is exceedingly difficult to expand the site by acquisition of adjacent vacant land, because in a few years increased values make such land out of reach for airport use, or what vacant land there was when the airport was established becomes developed with more or less costly structures which cannot be removed. Consequently, it is important to take as much land as possible when an airport is first established and to maintain control of the entire area in order to provide for future needs as well as to give an adequate, effective landing area for present-day airplanes.

It is not necessary to discuss in detail the permissible minimum sizes for flying fields. The United States Department of Commerce, through its Airways and Airports Section, publishes bulletins which are available to architects, engineers, and others interested, in which these dimensional requirements are discussed and a rating system is established. Colonel Harry H. Blee, chief of this section of the department and a member of the Lehigh Airports Competition Program Committee, in considering this matter felt it advisable to recommend an effective landing area of 3,500 feet in all directions, but at the same time he said that this is in excess of the space required for the highest airport rating. In other words, while 2,500 feet in each direction or even shorter runways, will suffice for minor airports and emergency landing fields, it is good judgment to take the largest area available up to approximately a square mile.

The gross area consists of three major space units, the first of which is the landing and take-off area which is wholly free from obstructions of any kind, and it is this part of the field which should be as large as circumstances will permit. Modern airplanes have a safe gliding angle of 7 to 1 and can gain altitude in approximately the same ratio. Hence, the effective landing area must be protected by the second space unit, which may be termed a marginal strip. The marginal strips must have a width which is seven times the height of any building or other elevated obstacle bordering on the landing field. It is perfectly feasible to utilize these marginal strips in various ways, providing the structures erected upon them do not project above a line having a 7 to 1 starting at the edge of the effective landing area. Such space may be used for parking automobiles and for mooring planes which do not require hangar protection, as well as for playgrounds, outdoor restaurants, parks, and various other types of concessions and amusements. In fact, the marginal area may be developed to produce an important revenue to the airport, for all of the European airports experience a steady flow of visitors who come to watch the flying activities. Over weekends from 10,000 to 12,000 persons regularly visit the Tempelhof field in Berlin to patronize the beer garden, the promenades, and the amusements while they watch transport

Perspective by Maurice Chauchon, French Architect, for a New International Airdrome at Pau, France

planes arrive and depart. The third section of the site is that part reserved for the important airport structures which will be mentioned later and which must be separated from the effective landing area by the same type of marginal strip which protects the other borders of the field. This vacant space, however, between the airport buildings and the landing field, is usually reserved for the maneuvering of planes, and is not available for public use.

The ideal airport must permit airplanes to land and take off into the wind at all times. Theoretically, the field should provide runways or lanes in all directions, even though the prevailing wind in any given locality may be predominantly from one quarter. Experienced flyers find no difficulty in landing into a quartering wind, but it is exceedingly difficult to land a plane crosswise with the wind. It is practicable, therefore, to have runways or landing strips in eight directions, equivalent to the four cardinal and four quarter points of the compass.

The problem of developing the field surface for landing and take off is one of the most difficult and expensive matters that is encountered in creating an all-purpose airport. Perfect drainage is essential at all times, and particularly for spring conditions, when the ground is thawing. When funds permit, it is of course vastly better to have the entire landing area surfaced or paved uniformly, but today the expense of such preparation is quite prohibitive. For some years to come, therefore, it will be necessary to provide landing strips or runways especially prepared for the landing and take off of planes, but these must be absolutely flush with the adjacent unpaved areas and as level as possible. The arrangement of these runways should be such as to allow the maximum number of planes to depart and arrive simultaneously without danger of interference or collision. It is also important that the runways as well as the entire field be surfaced with a material which will make artificial lighting for night flying effective at minimum cost.

Airport Structures

The modern airport must be conceived as a transportation terminal and must be equipped to handle passengers, mail, express, and even freight. It must also provide for private planes which do not operate on schedule, and for sightseeing planes which use the port as a base of operations. The required structures to serve these functions may be divided into three basic groups, exclusive of the accessory buildings which are desirable but not essential to the airport proper. These three groups include the terminal facilities, caring for passengers and cargo; hangars for the care of planes; and service units for housing maintenance equipment, supplies, and possibly also the personnel of the field.

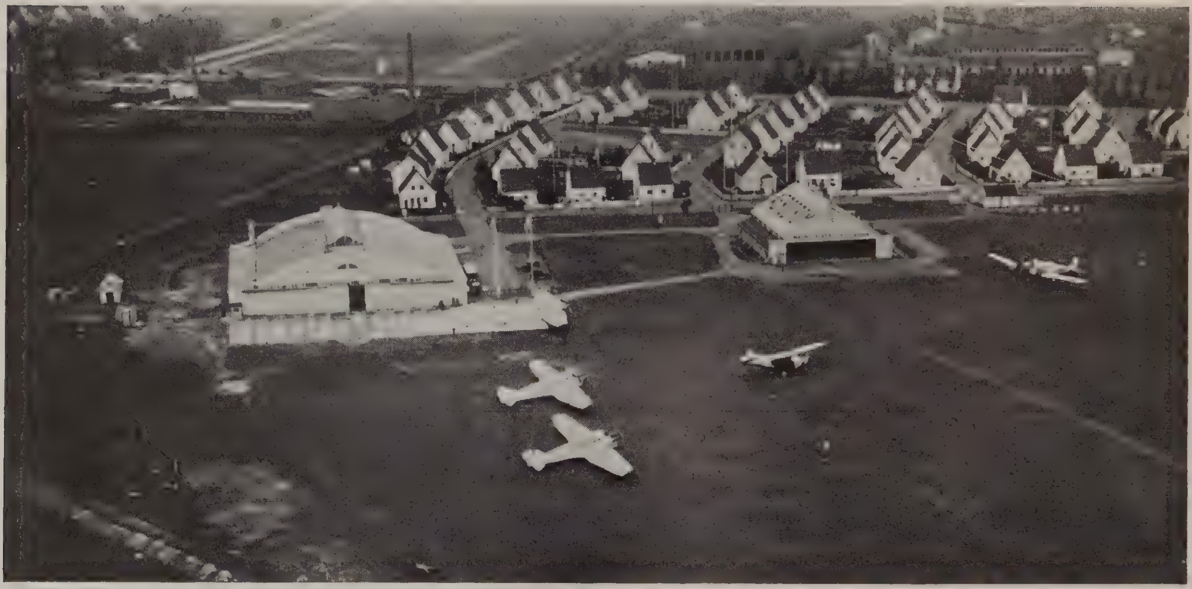
At Miami there is probably the most completely

Airplane View of the Ford Airport, Dearborn, Mich., Showing Buildings and Field

appointed terminal building yet erected in the United States. It was designed by Delano & Aldrich, architects. It contains a passenger concourse or waiting room with the usual ticket offices, check room, public toilet facilities, newsstands, and other concessions associated with the ordinary railroad passenger station. The main floor is so arranged as to control passengers arriving by plane from Cuba, for inspection by immigration, customs, and health authorities. This feature suggests that every airport in the United States may ultimately become a possible port of entry, for flights have already been made from Mexico to northern points in the United States, and from Canada to southern and western points. This building also provides offices for the air transport officials, and on the second floor, overlooking the flying field, there is a large dining room adjacent to an open air terrace which is a wonderful vantage point from which to observe the arrival and departure and the maneuvering of airplanes.

This building, more completely than any other, suggests the character of the ideal terminal structure for an airport. An important feature of such a building, unless provided for in a separate unit, is a control room, commanding an unobstructed view over the entire airport from which an operations executive can exercise complete control over all activities on the field. This control room is usually elevated above surrounding buildings, generally in the form of a low tower above the roof line of the highest structure, and it adjoins a radio and communications room equipped to maintain contact with other airports in all directions and by radio with planes in the air. These units constitute the nerve center of the airport and are vital to its operation because it is necessary to prevent planes from landing, especially at night or in fog, when others are about to depart, and to notify planes en route of other machines flying in their general directions to minimize the possibility of collision in mid-air and to aid them in keeping to their courses. Undoubtedly also the modern air terminal must provide post office facilities and a sub-station, although at present the Post Office Department does not consider these elements essential because the present custom is to remove air mail by motor trucks direct from the planes to existing post offices.

Another requirement of the well designed terminal building is provision for the safety and protection of passengers using private or transport aëroplanes. There should be some type of covered runway leading from the waiting room to the loading point for planes which is so devised as to prevent the passengers from getting in the way of whirling propeller blades. At a separate point there should be similar provision for protecting arriving passengers from inclement weather and for keeping them under control until



Malmo, Sweden's Spacious Airport, Showing Interesting Housing Development Near the Field

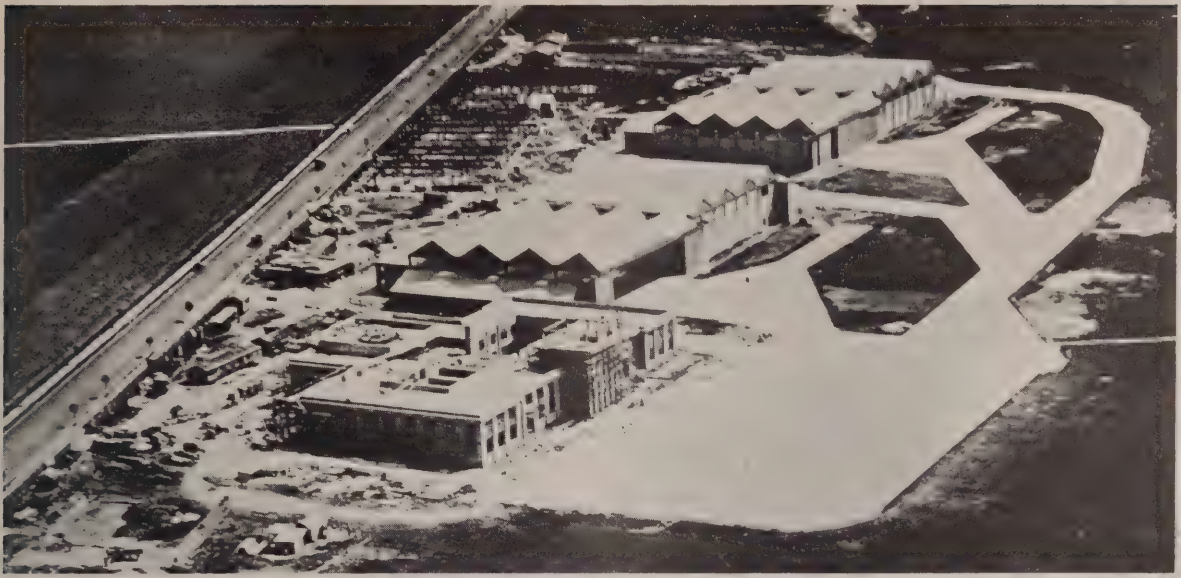
they have passed the immigration and customs authorities if the plane happens to have come from a foreign port. Separation of these two loading and unloading points is desirable. It is also essential to have the entire flying field protected by a suitable wall or fence which will keep unauthorized persons and often stray animals from the field and permit the control of even those using private planes in their entrance and egress from the flying area.

The second group of structures,—the hangars,—needs little discussion, because the functions of hangars are well understood. They require unobstructed floor space, good lighting, and should be fireproof, weatherproof and easily heated. In some European airports hangars are made two stories in height, using a ramp to reach the upper floor, and it is possible that the reverse will be true of some future airports having part of the storage space below ground. The most difficult problem in hangar design is to provide the vast doorways necessary for the admission of large planes. After much study the Lehigh Airports Competition Program Committee suggested some openings 125 feet wide by 20 feet in clear height, and others for smaller planes 90 feet and 100 feet in width and 18 feet and 19 feet respectively in clear height. These requirements may change as transport planes become larger, but for the present they will house the typical units now contemplated or in use.

Building at the Dennison Airport, Atlantic, Mass.

The third group of buildings includes fire and ambulance stations with quarters for emergency crews and garages and storage buildings for trucks, tractors, snowplows, rollers, grass cutters and other equipment needed for the care and maintenance of the fields. A gasolene and oil filling station is an important requirement to this group. Frequently the tanks are buried underground and supply lines are run to pumps near the hangars or to underground receptacles located in concrete aprons on the fields themselves. These sub-surface filling points are covered by manholes which can be lifted and the fill pipes withdrawn so that when the covers are replaced planes can run over the surfaces without difficulty. There must also be provision for housing the field personnel, but this may be provided for outside of the airports proper or in parts of hotels which are mentioned under the heading of "accessory structures."

The arrangement and grouping of these various units constitute a problem that has not yet been solved with a certainty that the ultimate plan has been discovered. In some airports the hangars are separate units, and in others they are grouped together as elements of a large structure. In some places they are adjacent to the passenger terminals, and elsewhere they may be separate from these units for considerable distances. It is essential to provide a well paved and practically dustproof apron connecting the hangars and the loading



Construction in Progress, New Croydon Airport with System of Concrete Aprons and Maneuvering Space

point at the passenger terminal for maneuvering planes either under their own power or by means of tractors and for warming up motors where the wind stream from the propellers will not throw up a cloud of dust. If the flying field is of adequate size and the buildings can be separated from the field by a sufficient marginal strip as already noted, their precise relationship to the flying area seems to be of secondary importance, and their location is largely governed by the highways and other means of communication between the port and the city which it serves. If the field is of limited area and the runways are of minimum length, it should be considered essential that no buildings be located opposite the end of any runway, and particularly that they should not be in the direction of the prevailing winds.

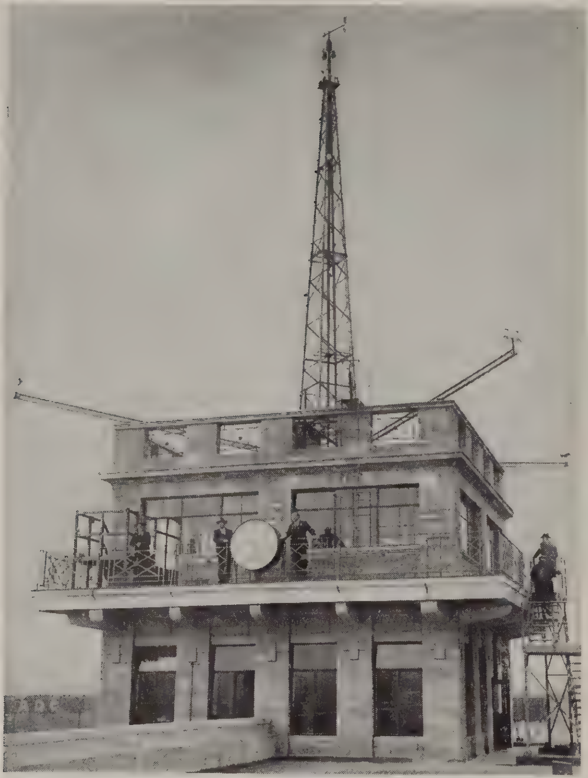
Accessory Structures

Under this head fall a number of possible units which have already found their place in well established European airports but which may not be absolutely essential to port operation. First of these is a hotel. At Croydon, England, a 200-room hotel has been erected near the airport buildings and has proved successful. It has been found that many visitors to the field use its extensive restaurant facilities, which overlook the flying area, and that passengers frequently use it as headquarters from which they make visits to the surrounding country during interruptions to their air travel. Such a building may also provide accommodations for pilots and the ground personnel of the field as well as provide apartments for the important officials and executives of the field and the air lines which converge there. Under this heading also fall all types of concessions and amusements as well as parking spaces for visitors' automobiles, outdoor restaurants, motor bus and rapid transit stations, stores and shops. Undoubtedly commercial activities of these various sorts will contribute to the support and maintenance of airports, and their control by the airport owners is economically desirable.

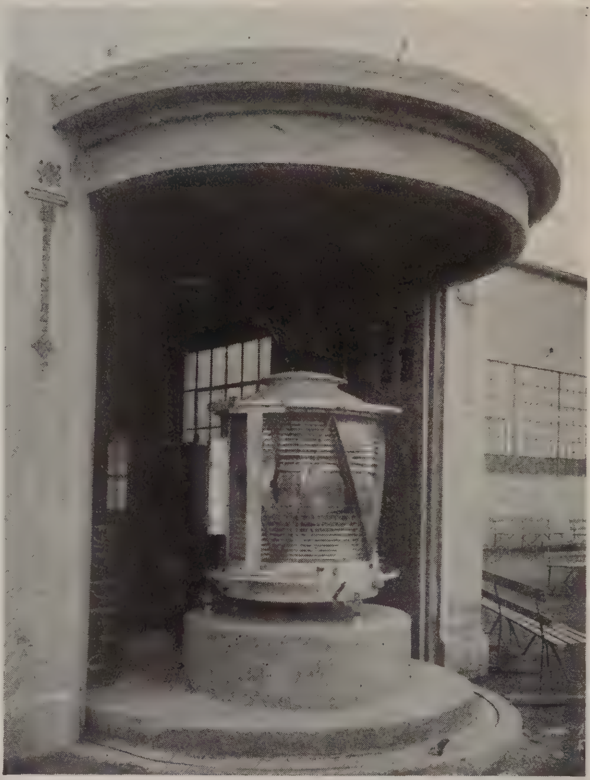
Other Requirements in Airport Design

Night lighting is one of the first essentials for the well equipped airport. The subject needs little discussion here, however, because the problem does not influence the architectural development of an airport to any great extent, and because the subject is quite fully covered in publications issued by the Department of Commerce and other authorities. Adequate lighting involves border lights to indicate the margins of the field; air beacons; an illuminated wind direction indicator; danger lights on all surrounding obstructions; and flood lights to illuminate the field for landing and take off. Every airport must be identified by huge signs visible from the air and preferably illuminated at night. These may be on the roofs of units or other buildings on the field itself or

Buildings of the Oberweisenfield Airport, Berlin



Control Tower, Croydon Airport, with Signal Cabin and Wireless Equipment



Airport Beacon of 30 Million Candlepower, at Oakland, Cal.

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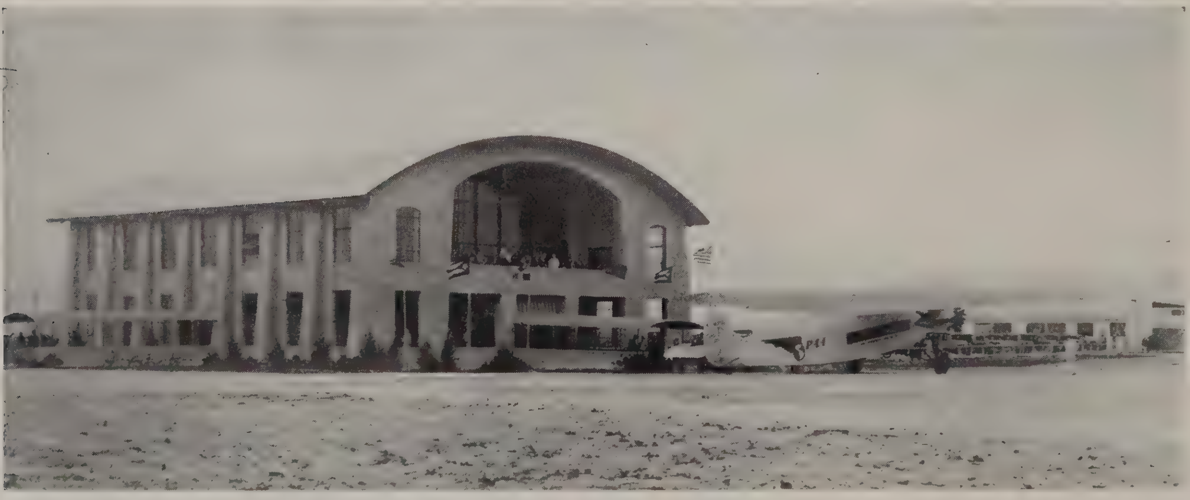
even on adjacent buildings in the vicinity, with arrows pointing to the airport itself. Here again the Department of Commerce has established recommendations and requirements which are easily followed. The wind direction indicator referred to, sometimes called the "wind-tee," is something like a mammoth weather vane with its flat surface *horizontal* so as to be visible from the air and to constantly point the direction of the prevailing wind.

One of the major problems in airport design involves locating the field with relation to adjacent highways and transportation facilities. The amount of traffic ultimately to be expected at airports suggests the desirability of having a broad plaza, such as may be found adjacent to the better planned railway terminals, which will care for the traffic converging at the passenger terminal and give this structure a proper and dignified setting.

Editor's Note. We are indebted to Mr. Harry Schwarzschild, Editor of *Airports,* for giving us permission to publish here many photographs from his personal files.



Airport Passenger Terminal of the Pan-American Airways, at Miami
Delano & Aldrich, Architects

CHOOSING THE STRUCTURAL SYSTEM AND MATERIAL

BY

THEODORE CRANE

ASSOCIATE PROFESSOR OF BUILDING CONSTRUCTION, YALE UNIVERSITY

PART I—BUILDING FRAMES

IN looking over the vast quantity of printed matter dealing with the subject of building materials, one can hardly fail to be impressed by the amount of study and research which has been expended in this field. If an architect is considering the use of a particular type of construction, there are usually technologic papers, textbook references or society reports bearing upon its value. Very little attention, however, has been given to that aspect of the subject which might be called "comparative construction," that is, the *relative* value of materials and systems.

To make the matter clear, let us consider a very simple illustration,—the choice of a floor system. Every textbook on reinforced concrete describes the so-called "beam and slab" and "girderless" designs. An architect's office is flooded with manufacturers' literature illustrating any number of proprietary methods of construction. The architect's problem, however, is not the detailed study of a particular system, but the selection of the most suitable type for the conditions existing. With this in mind, these articles have been written to point out the individual characteristics of various materials and systems, as affecting their use, and to suggest methods of arriving at a satisfactory choice in structural work.

The first question of this nature, and a question which can usually be very easily answered, is regarding choice between bearing walls and skeleton construction.

In most cases the problem is purely economic, and the thickness of bearing walls, where such are employed, is governed by the requirements for stability rather than by the strength of the materials in compression. Under the New York building code, which represents in this particular those of our larger cities, brick masonry laid in Portland cement mortar is allowed to take a working load of 250 pounds per square inch, Portland cement concrete 500 pounds, and sandstone masonry 400 pounds. These stresses are seldom critical in bearing walls. The limit of economy is determined rather by the wall thicknesses required for various heights and unsupported areas. For instance, a building of the residence class, under 75 feet in height, would require, by this same code, 12-inch walls for the "uppermost 55 feet, and 16-inch below that." For public or business buildings between 60 and 75 feet in height the bearing walls would have to be 16 inches thick for the "uppermost 50 feet, and 20 inches below that." In both cases additional thicknesses are required for walls built of rubble masonry. Furthermore, when the clear span between bearing walls is over 26 feet, or the length of the wall without lateral support is over 105 feet, or more than 30 per cent (45 per cent when wall area is laid in Portland cement mortar) of the horizontal wall area is occupied by openings, the thickness must be increased. Wall thickness for wall-bearing buildings over 75 feet in height increases very rapidly. For example, in the class of public and business buildings a structure 80 feet high would require, under the New York code, 16-inch walls for the uppermost 25 feet, 20-inch walls for the next lower 35 feet, and 24-inch walls below.

Compared to these requirements, a 12-inch panel wall, supported at each floor level by a structural steel or reinforced concrete spandrel, is usually more economical, all things considered, for fire-resistant construction over three or four stories in height, and for garages or industrial buildings of even lesser height. The use of structural steel frames for one-story buildings is often desirable to meet the requirements of certain industries, and although still in an experimental stage, the application of steel sections to the construction of dwellings has interesting possibilities for classes of work where economy is a chief consideration. These uses of steel are, however, the exception, and its particular function is in the frames of comparatively tall buildings.

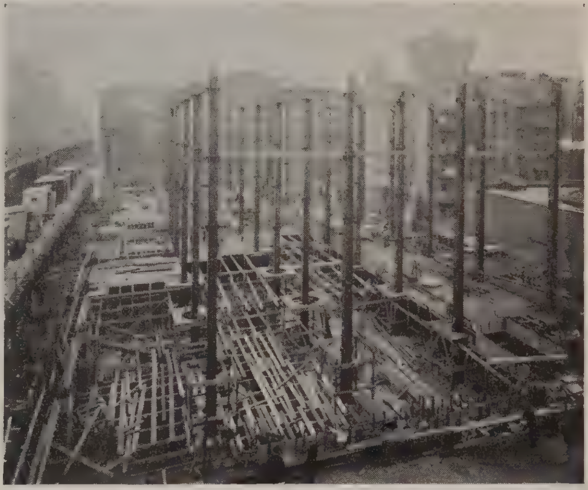
For this type of work the practice of a few years ago of employing columns built up of plates and angles has largely given place to the use of solid rolled sections, normally two stories in height and designed to carry the load of the lower story. A comparatively recent development is the use of column sections, five to six stories in height, for the support of reinforced concrete floors. Finding that two-story lengths were impracticable and desiring to use a heavy H-section through the lower stories in order to save floor space, these long columns fitted with angles at each floor level have been successfully used for buildings of 10 to 20 stories, to support stone-concrete floors of girderless design. This type of column construction, as built in New York, usually calls for a reinforced concrete section through the upper stories of the building, which is carried down until the size becomes objectionable. For

Photo. Tebbs & Knell, Inc.

Uppercu-Cadillac Building, New York. Reinforced Concrete Frame with Interior Steel-cored Columns

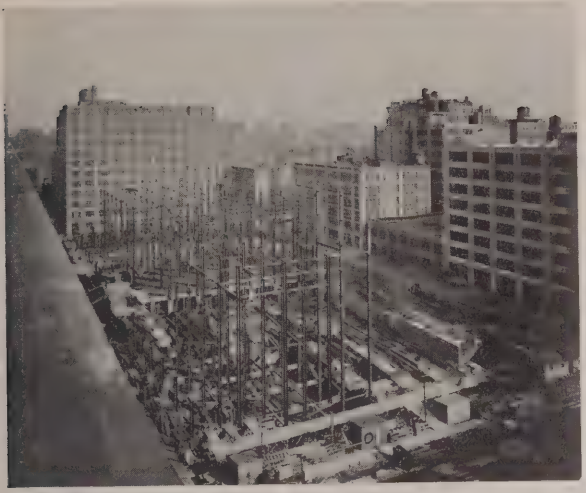
example, let us consider that the upper eight floors and roof of a 14-story building are supported by reinforced concrete columns. Under the New York code these would probably be of hooped section in the two upper stories and of spiraled design below. Even the latter, however, would require a gross diameter of about 2 feet, 6 inches, when carrying large bays subjected to light manufacturing loads. If this were considered to be a limiting size, the fifth story columns would then be designed with rolled steel cores of H-form, the sections being based on the loads which the fifth story columns are required to support and plates added to take the increments due to the floors below. The gross column size, 2 feet, 6 inches, would then be the same in all of the remaining lower stories.

Such a combination of structural steel and reinforced concrete makes it possible to utilize the advantages of each material, now that the mechanical difficulty of field erection has been solved by obtaining long sections from 60 to 75 feet in length. With this one important exception, however, the structural steel frame, or the reinforced concrete frame offers two distinct alternatives in the field of skeleton construction. For buildings of certain classes the choice is obvious; factories and warehouses with heavy floor loads ranging from 125 to 300 pounds per square foot and of comparatively low height can generally be built more cheaply of reinforced concrete than of structural steel. Office buildings, hotels and apartments, 15 stories or more in height, can usually be built more cheaply with steel frames. But we must not place too much confidence in such broad generalizations. The tallest concrete building in the United States is the recently completed Master Printers' Building in New York, which has 20 stories. In this case the use of concrete showed a very substantial saving over steel. Let us investigate the conditions. A live load of 250 pounds per square foot was required on all floors; the plan of the building was adaptable to a girderless floor system, which is extremely economical for heavy industrial loads. As the conditions of occupancy demanded that headroom be computed to the bottoms of girders in a beam and slab design, their elimination permitted several additional stories in the same total height of building. Furthermore, the lighting was better with girderless construction, and the cost of sprinkler installation was about 25 per cent less.



Framing of the Uppercu-Cadillac Building. The Floor Construction is of the Girderless Type
Charles E. Birge, Architect

The same solution has been worked out economically in the case of several other structures erected in New York during the last year. For example, there are the Appraisers' Stores Building, 11 stories high, with 250-pound live load; a service station for the Packard Motor Company, eight stories high, with 150-pound live load; and the building at 653-659 Eleventh Avenue, 14 stories high, with 200-pound live load. These were all concrete-framed buildings employing structural steel cores in the lower stories of the interior columns and with girderless floor systems of spans varying from 20 feet x 20 feet to 31 feet, 6 inches x 33 feet. If we are to assume, as would seem reasonable, that these operations represent an actual trend in design, it is probably safe to say that reinforced concrete frames, particularly where a girderless floor system can be used, are well adapted to comparatively heavy loads for buildings even up to 20 stories in height.



Framework U. S. Appraisers' Stores, Combined Long Column-cores with Girderless Floor System

Structural steel is particularly suited to light loads and tall buildings. Although we have approximately 650 reinforced concrete structures in this country that are ten or more stories in height, the vast bulk of such work is of steel. Under the New York code a structural steel frame with cinder-concrete "arches" is a very economical type of construction for normal designs based on office loading of 60 pounds per square foot throughout typical floors. For buildings of over 20 stories in height, steel has practically no competitor in any part of the country. Below that height, offices, hotels and apartment houses in New York are built almost exclusively of steel with cinder-concrete floor arches. In many western cities, on the other hand, even where material prices are no more favorable to use of concrete, the latter has been widely and successfully used for work of this class. Trade conditions and the tendency to follow the established custom of one's own locality, would often appear to play a larger part than the matter of comparative costs.

Second only to the matter of live load, the architectural plan of a building plays an important part in the choice of construction. One of the great structural advantages of reinforced concrete, as ordinarily used, is its monolithic character, permitting assumptions of continuity in design. When the architectural arrangement lends itself to a series of continuous bays of approximately the same size, the use of a reinforced concrete frame may be an economical solution for even light loads and, as previously mentioned examples indicate, will almost always be suitable for heavy loads. The matter of continuity will not, ordinarily, make any difference in the depth of beams or girders, in beam-and-slab construction, but it will save anywhere up to 35 per cent of the reinforcement that they require. Reinforced concrete is particularly suitable for buildings that permit a column spacing that results in square or nearly square bays. As a large proportion of the cost of concrete work is expended on the construction of forms, this material is most economically used for buildings whose structural members can be standardized. The importance of this principle can be judged by the fact that on typical work one set of forms serves in turn for the structural members of each floor, often being used as many as ten times. Neither is it usually desirable to reduce the sizes of beams supporting a roof construction, as the surplus concrete is more than offset by the saving in not changing the forms.

Photo. Tebbs & Knell, Inc.

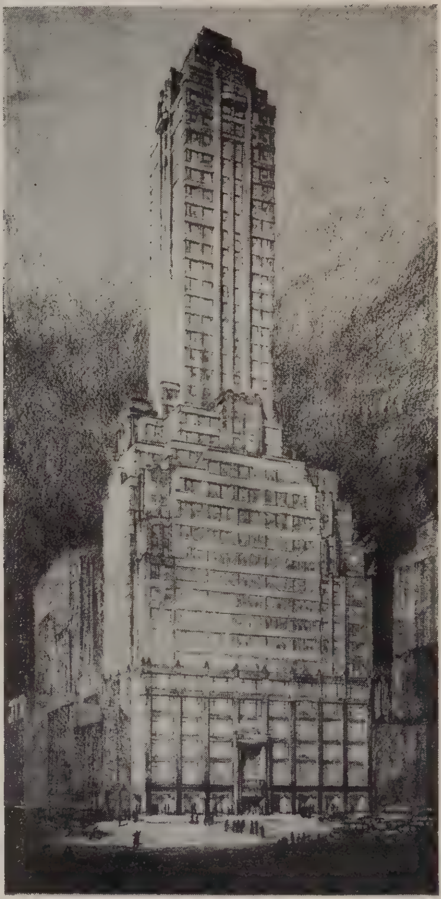
U. S. Appraisers' Stores Building, New York

Buchman & Kahn, Architects

The ideal spans, in both reinforced concrete and structural steel, vary between 18 and 24 feet, depending upon the live load and the type of floor construction employed. In most buildings outside of the industrial and commercial classes, the columns have to follow the room arrangement, and it is seldom possible to use the most economical spacing. As far as practicable, the designer should start with the primary element of a floor system, such as the slab, and lay out his typical floors to use each member to best advantage. We have an excellent example of this principle applied in most New York buildings now under construction. The city code permits cinder-concrete slab or "arches," as they are called, to be used on spans up to 8 feet. A minimum thickness of 4 inches is specified for floors. The designer's problem is then to locate the floor beams, which support the slabs, as closely as possible to the 8-foot limit. As it works out very well to frame the beams into the girders

Master Printers Building, One of the Highest Concrete-framed Buildings. Floors of Girderless Design

Frank Parker, Architect and Engineer



The Fuller Building, New York, Typical of Work Economical in Steel

Walker & Gillette, Architects

at the third points of the girder spans, we have a column spacing which approaches 24 feet if we wish to fully develop the strength of our 4-inch slab which the building code requires.

This same principle can be applied to other matters in the design of structural frames. A 3½-inch thickness of stone-concrete, which is the minimum allowed for roof construction under the present New York code, when fully continuous will carry a 43-pound superimposed load between beams placed on 10-foot centers. The limit of the 4-inch stone-concrete slab, when supporting a 100-pound live load, is 8 feet, 6 inches when fully continuous and 7 feet, 9 inches for end spans. The weight of reinforcement per square foot of floor area naturally increases as the column spacing is increased. For example, a girderless floor system designed under the two-way requirements of the New York code, to support a superimposed load of 125 pounds per square foot, would require 1.85 pounds of steel per square foot of floor area with bays 16 feet square; 2.35 pounds for bays 20 feet square, and 3.10 pounds for bays 24 feet square. These figures are based on full continuity. Considering the cost of footings and columns, the most economical bay would probably be about 18 feet square. Considering the loss of floor space occupied by the columns, the present practice is to space them about 20 feet on centers,—probably a little over rather than less.

For long spans of 40 feet or more, reinforced concrete can be used in either arch or truss construction. Such designs have been cleverly executed both in this country and abroad, but if economy is the governing factor, steel should be used in most problems of this nature encountered in building construction. There is even a tendency to use concrete girders on shorter spans where structural steel would be more economical.

Consider, for example, that it is required to span a distance of 34 feet between masonry walls. If we assume a uniformly distributed load of 100,000 pounds and a floor system capable of giving lateral support, a structural steel girder 24 inches deep and weighing 120 pounds to the linear foot will meet the requirements of the American Institute of Steel Construction. If headroom is not important, we could probably obtain a 28-inch section, weighing 112 pounds per linear foot which would also serve the purpose. In reinforced concrete, a T-beam section, economically designed, would have a total depth of about 36 inches, a width of 14 inches, and approximately 1,650 pounds of steel if computed at working stresses of 650 and 18,000 pounds per square inch for the concrete and steel, respectively. Even these large proportions would have to be greatly increased unless the floor system chosen by the designer provided an adequate thickness of concrete to act as a compression flange. It is also true that the weight of large concrete beams and girders may easily be 20 or 25 per cent greater than that of steel, including fireproofing.

These facts would favor the use of a structural steel frame, or bearing walls with structural steel interior framing, for buildings requiring wide spans. Balconies, such as are found in many auditoriums, may also influence the designer in his choice of structural frame, as such can usually be more expeditiously and economically built in steel than in reinforced concrete.

The question, however, is too often decided by making merely a relative estimate of the costs of labor and materials, both based upon the *same design*. A valid comparison cannot be obtained in this way. As far as the architectural requirements permit, comparative estimates should be based on designs which employ the type of material under investigation to its fullest advantage. Reinforced concrete is particularly suited to some forms of architectural expression, and even if it is not possible to actually "express" the feeling of concrete in the form or ornamental features of a building, it is entirely practicable to reserve its use for types of construction which are easily built of this material. The same should be true of structural steel; many architectural offices use steel sections more as a matter of habit than as the result of analytical comparison. Not a few designers look upon concrete as suitable for industrial work, but hardly to be considered for other types of buildings except in floors and footings and as a fireproofing material. On the other hand, there are sections of the country where concrete frames are very widely used for buildings of moderate height even with comparatively light loads. A study of relative costs, as influenced by local conditions, does not seem to justify this difference in practice. From these data, and many similar considerations, we can be fairly confident that both the structural and architectural character of a building should play an important part in determining the type of skeleton to be used.

The design of the reinforced concrete members forming the structural frame of a building is very largely influenced by the code or standard accepted by the designer, and it is not the province of this journal to treat of matters pertaining to the details of structural engineering. The architect is seldom interested in determining the number of stirrups in a concrete beam any more than he is concerned with rivet spacing on structural connections. It is important, however, to know that concrete beams of T-section require about 1 inch in depth for every foot of span; if the beam is of rectangular section, there being no concrete floor serving as a flange, 1¼ inches would be a fair estimate. These figures are based on economical design for normal conditions and could be reduced by increasing the reinforcement if the additional cost were warranted. The width of the web of a concrete T-beam should be between one-half and one-third of its total depth, including the slab. Rectangular beams are usually about one-half as wide as they are deep.

Columns composed of concrete reinforced with only vertical rods are allowed under most codes, to sustain concentric loads computed as 500 pounds or 600 pounds per square inch on the "effective concrete section," the value depending upon the quality of the mixture. The effective concrete section should be taken as the net area,

The Women's Institute Building, Scranton, Pa.
William Lowndes, Architect

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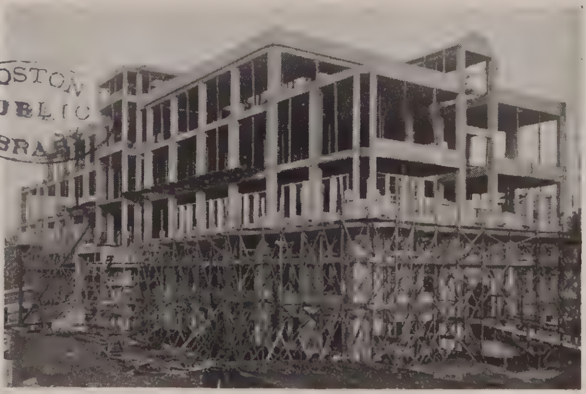


The Frame is Reinforced Concrete and the Floors of R. C. Beam-and-Slab Construction

Brick Used Over Reinforced Concrete Frame, Sanitorium Near Atlanta, Ga.
Hentz, Reid & Adler, Architects

exclusive of the steel, allowing 2 inches outside of the reinforcement for purely fireproofing purposes. Some codes, such as that at present in force in New York, allow the effective area to be taken as the *gross* column section, deducting only the space occupied by the reinforcement, which seldom exceeds 1 per cent of the area. The total supporting capacity of the column is then computed, in either case, by adding to that of the concrete the carrying value of the reinforcement, which is considered to support 7,500 pounds or 7,200 pounds per square inch when used respectively with 500-pound and 600-pound concrete.

Although the design of columns with only vertical reinforcement is pretty well standardized, there is no uniformity in regard to spiraled columns. Unfortunately there is some slight justification for computing their sustaining value on several entirely different principles. These have been picked up by the authors of our various building codes and combined with a variety of limiting percentages applied to both the amount of spiral and of vertical reinforcement. Although the present situation is an amusing commentary on our knowledge of this branch of structural engineering, or rather a reflection upon our ability to apply what little we do know, the matter is too technical to be of interest to the average architect. Suffice it to say, that under the New York code a spiraled column, economically designed with 1 per cent of vertical steel and 2 per cent of spiral, can be considered to support 1,466 pounds on each square inch of the core enclosed by the spiral. In other more benighted sections of our country this same column would be permitted to carry only 971 pounds on each square inch of the core. These absurd differences, although more pronounced in the field of concrete design, exist in the ordinances governing use of other materials. There seems to be no particular reason why structural grade steel of exactly the same quality should be considered to carry a working stress of 16,000 pounds per square inch in one city and 18,000 pounds in a neighboring city. The proper remedy for these inconsistencies lies in an honest attempt to make municipal codes conform with good practice. The specifications and suggested regulations promulgated by the American Concrete Institute, The American Institute of Steel Construction, and the building committees of the Department of Commerce, contain much valuable information which could be applied to advantage.

Footings. The study of comparative construction as applied to footings offers an interesting field for the architect who desires to control the major decisions in connection with the structural work, without going into the details of engineering. For all buildings of skeleton construction, whether of steel or reinforced concrete, the problem of footing design is merely to choose the most

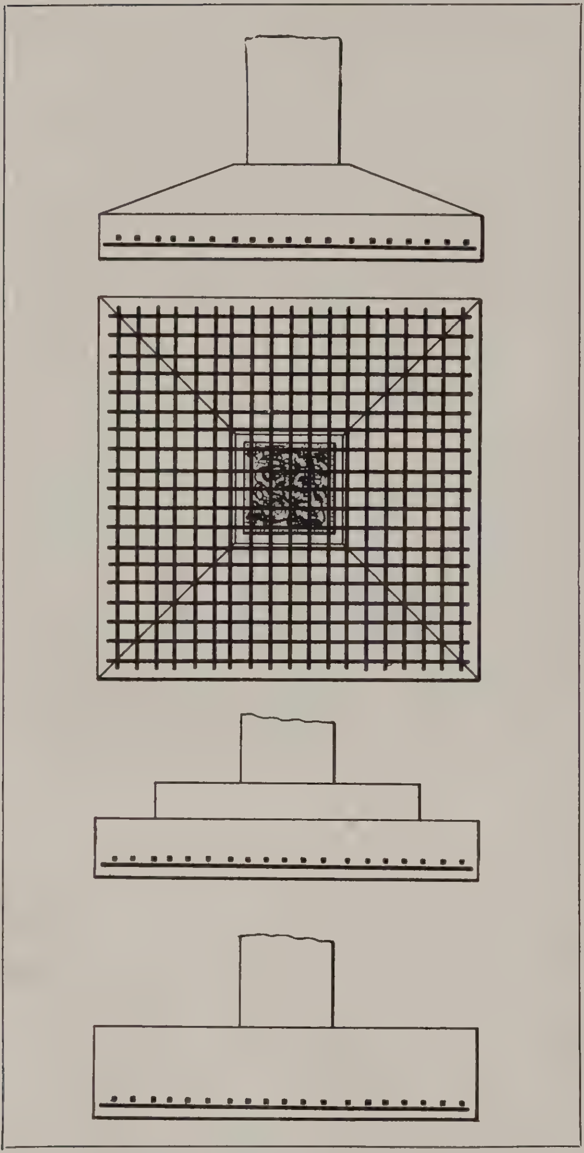
Reinforced Concrete Frame of Building Shown on Opposite Page
Hentz, Reid & Adler, Architects

economical means of distributing the concentrated loads of the columns over an area sufficiently large to bring the load per square foot within the safe bearing capacity of the soil. Foundations upon rock involve one aspect of this same problem, and the use of wood, concrete or steel cylinder piles is only to increase the soil capacity. Independent footings, rectangular and preferably square in plan, of stepped or pyramidal pattern, are normally used to support the interior columns of a building and are also economical for exterior columns of skeleton structures, if there is space outside of the building line to permit concentric design. The chief problem is to choose economical footings for exterior columns when there is little or no space available beyond the building line. With the exception of a type known as the "buttress footing," and not widely accepted, the choice falls on either a continuous, a cantilever or a combined footing.

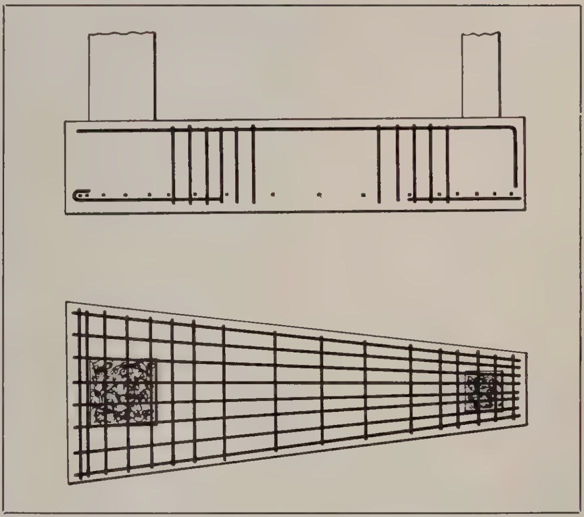
A continuous footing, which is nothing other than an inverted beam loaded with a soil reaction of usually from 6,000 to 8,000 pounds, and supported by the columns, will probably be the most economical if the area available without eccentricity is sufficient to carry the column load. For example, if we are permitted a projection of 1 foot beyond the faces of the columns, which we will assume as the building line, and if the basement columns are 2 feet thick, we can make the footing beam 4 feet wide and still have its axis directly below the column centers. If the column spacing is 20 feet, we then have 80 square feet of available bearing area for each column. If the safe soil load is 6,000 pounds, this type of footing is capable of supporting a column carrying 480,000 pounds with some small deduction for the weight of the footing beam.

The next choice, usually resorted to where no projection is permitted beyond the faces of the columns, and referred to as the "cantilever" footing, is merely the application of a device for overcoming the tendency of the exterior columns to fall outwards owing to the fact that their footings cannot be centered beneath them owing to the proximity of the property line. The design, in this case, is similar to that of an interior, concentric footing but a concrete or steel beam, called a "strap," is built connecting each exterior footing with the nearest interior footing. The strap balances the eccentric moment and holds the exterior footing in equilibrium.

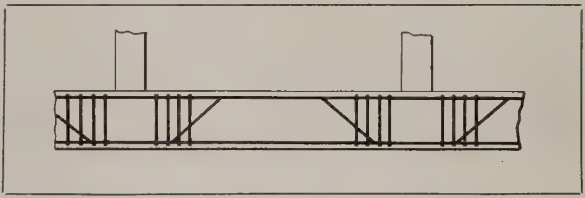
The third choice for the footings of exterior columns adjacent to property lines is called the "combined" footing. Instead of employing a strap, as in the cantilever design, a heavy, continuous slab forms the footing for an exterior column and the nearest interior column. As the name implies, this is merely a joining, or combining of the two footings and is resorted to when



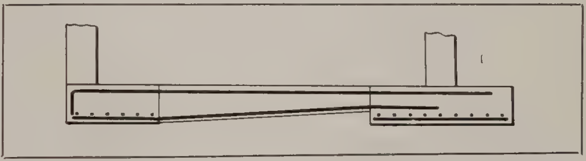
Typical Design of Reinforced Concrete Footing for Isolated Columns of either Structural Steel or Concrete; the Stepped Type is Preferable



The Combined Footing of Trapezoidal Type; Exterior Column at Right of Illustration



This Continuous Footing Acts as an Inverted Beam to Distribute the Loads of Exterior Columns



A Typical Cantilever, or "Pump-handle" Footing; the Exterior Column is at Left of Illustration

it is necessary to overcome eccentricity in an exterior column and use the *entire area* between columns for bearing purposes. When possible, combined footings are built rectangular in plan and extend toward the interior of the building a sufficient distance to insure that the center of reaction of the footing area coincides with the center of load between columns. If such extension is not practicable, owing to the interference of an elevator well, or some similar obstruction, the portion of the footing supporting the interior column, which is usually carrying a heavier load than the exterior, is widened with the result that the footing slab is trapezoidal in plan.

Footings on piles follow these same classifications and are designed in exactly the same way except that the individual pile reactions replace the uniform load assumed as the safe bearing capacity of the soil. Footings resting on rock are designed for loads varying from 15 to 40 tons per square foot, depending upon its hardness. Under our tall steel structures the typical billet and grillage design has become the general practice for foundations carried to hard rock. Where it is necessary to obviate vibration, such as that due to the movement of trains, specially designed vibration mats, composed of layers of lead and sheet asbestos, are employed at the bases of columns supporting buildings over railway tracks.

The next step in planning the structural design of a building is the choice of the floor construction. This subject will be covered in a succeeding article in THE ARCHITECTURAL FORUM for May.

The illustrations of footings are from "Concrete Building Construction," by Theodore Crane.

WINTER CONSTRUCTION AND SUPERINTENDENCE

BY

LEICESTER K. DAVIS

THE trials of keeping winter construction going smoothly and on unbroken schedules are over. The vigilance required to meet the attacks of cold and ice and snow has settled down to being a far less difficult matter. It is a good time in which to make a check-up of results secured during that short but difficult period, and for architects and builders to consider the effectiveness of their combined efforts in keeping winter activities going at high levels of efficiency and economy.

The records of superintendence will doubtless settle many questions, show the wisdom of using precautionary specification clauses, and justify closely coupled contacts that follow each step and stage of construction most likely to be adversely affected by winter's influence. The purpose of all architectural superintendence is constructive, not destructive,—the obviating of faults which if not discerned in their early stages result in piling up those disconcerting "extras" always associated with elaborate correction or replacement of work not up to required standards.

The difference between supervision and superintendence is not, perhaps, as fully appreciated as it should be. The former term deals mainly with results and passes judgment according to standards established for completed work; the latter follows more closely each unit of work throughout its progress, giving attention to immediate materials and methods, as well as taking into account those supplementary elements not strictly within the province of the specifications. Supervision stresses final responsibility; superintendence performs a more coöperative service, which begins at the beginning and keeps on to final completion. All architects may not agree upon this grouping of relations, but many do, and it is from the point of view of those who do that distinction is here made in describing the more important specific methods with which architectural superintendents should be thoroughly familiar in order to render the coöperation which contractors welcome and by which owners benefit.

Reading through many notes made during interviews with representative architects, I have been impressed by unanimity of their opinions in regard to winter superintendence. All seem to be agreed on:

1st: The need of many and frequent architectural contacts with winter work at every stage.

2nd: The value of familiarity with the precautionary methods developed by various trades.

3rd: The necessity of forecasting procedure in regard to conditions under which each phase of construction shall go on.

4th: The good to all concerned of thorough understanding between the architect, contractor and owner as to the powers and responsibilities of the architect or his representative in advising or requiring specific forms of structural practice.

5th: The benefits which result from carefully worked out methods by which accurate progress reports of superintendence may be kept for incorporation within a permanent record for current and future reference.

Most architects with whom I have talked emphatically recommend employment of a "clerk of the works" for all construction of any size that extends through the winter months, this individual to be selected by the architect and to be under his direction with services paid for by the owner, and to have duties, powers and remuneration covered by contractual clauses. Maintaining superintendence of this character is a regular procedure in many offices. In others the office personnel includes a "field man" who is assigned, at an extra charge, to work during all or certain winter stages.

Perhaps the first preliminary consideration of the architect in his approach to problems of winter construction should be the preparation of an outline which indicates how his contacts shall be governed. A comprehensive plan, worked out well in advance of the cold weather period, is sure to be of assistance in preventing otherwise puzzling twists and turns. Such an outline need not be elaborate. It should be built about only those definite phases of the work most likely to be seriously affected by lack of proper precautionary methods. It should cover uncertain points with clear indication of possible contingencies and directions regarding the manner in which they should be provided for.

In this schedule of defence, one might well start from a list of materials and uses having definitely known requirements for protection, classifying with each the possible circumstances to be faced. In an analysis of this kind, proper protective ways and means almost automatically suggest themselves for situations that might not be thought of until a crisis in construction had arrived. At this preliminary stage the value of coöperation by an experienced winter constructor will often be extremely valuable, since what are sought are not merely descriptions of "textbook happenings," but rather those out-of-the-ordinary run of things which happen once in a blue moon,

Interior Brickwork and Proper Temperature Control. Note Muslin Covering Door and Window Spaces, and Salamander Placed to Effect Equal Radiation of Warmth

Thawing Out a Snow-covered Pile of Bricks with Steam Hose Should not be Necessary. Brick Should be Stacked with Complete Coverage of Top and Sides of Stack

and which sooner or later may happen again.

One architect with whom I have discussed the subject has made a series of "pre-structural conferences," as he calls them, with winter-seasoned contractors a routine matter, even before specifications are ready for bids. This practice he considers especially important where the construction schedule is to include a part or all of the winter months. By frankly explaining his purpose to prospective bidders, he has gained information regarding precautionary methods which has not only aided subsequent superintendence but has also clarified sections of his specifications covering winter performance. In an outline such as that here referred to, several divisions are quickly established. The first of these will very likely deal with those elements of the structure upon which superintendence should be most thoroughly concentrated. Next, logically, follows the storage of material prior to its use; next, the methods to be employed during and following such use; finally, there will be the general standards of winter practice and the specific forms of protection best suited to the locality and the type of structure. Included in this last should be provisions for "potentials,"—those things which probably will not occur, but which may.

Structural safety is, of course, one of the prime factors with which superintendence should deal at any time of year. There must be assurance of soundness in the bones and sinews upon which a building depends for ability to carry its load. And these, in practically all modern construction are steel, concrete and brick. Erecting steelwork in winter requires few departures from the routine of other seasons, except perhaps extra provisions for workers subjected to hazards and discomforts of weather, wind and bitter temperature.

Construction of concrete and masonry, on the other hand, calls for more carefully worked over methods. The aggregate that slushes to December wall and floor and column forms, and the courses of brick that rise steadily despite numbing January days, are propositions very different from like work carried on in fair and warmer months of the calendar. Winter concrete is a finicky jade, and she exacts very definite forms of attention at equally definite stages of preparation, application and setting. In order to make sure of final structural dependability in concrete, superintendence by the architect or his representative is of the utmost importance from the start to the finish of operations. Freezing temperature is concrete's greatest enemy,—one that is present from the minute the dumped sand and gravel start on their way to the mixer. Therefore the architect's plan of superintendence should include a check-up on provisions made for heating, while actual superintendence should see that the means provided are adequately employed.

Supports Ready for Tarpaulins. The Frames Must be Sturdy to Withstand High Winds. There Should be Projection to Insure Space for Ample Circulation of Warmed Air About the Exteriors of Forms

In Winter Superintendence it is Well to See that Snow Accumulations are Removed Before a Thaw Forms Puddles which an Overnight Freeze May Turn to Treacherous Sheets of Ice

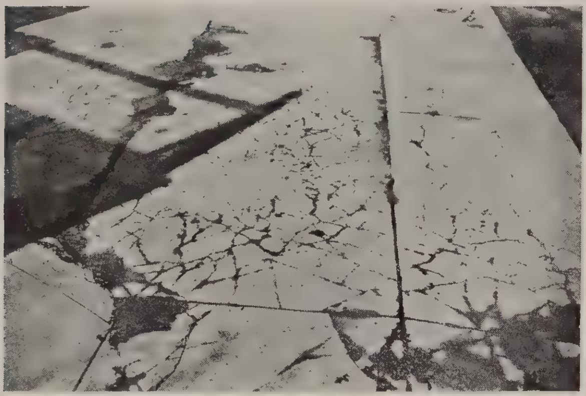
The warming of sand and gravel before they reach the mixer must be thorough and constant,—on small work, by the heat from wood-fired pipes traversing the mass, and on larger work, having considerable tonnage, by spreading the mass over and around grilles or coils of perforated steam pipes, so placed that distribution of warmth is evenly made throughout the material. The mixing water should be kept at tested temperature by a steam nozzle run into the water barrel at the mixer.

These are but preliminaries. It is after the mix reaches the forms that the closest watch must be kept against laxity in maintaining protection of the concrete as it attains the final set. Protective methods for concrete have become pretty well standardized. It is the duty of the architectural superintendent to see that they are employed at the right time and in the right way. Before winter concrete work is begun, the architect and his contractor should be satisfied that apparatus adequate in type and capacity is ready to operate as soon as forms are built. The number and sizes of tarpaulins required should be carefully figured. The methods by which they are to be hung and lashed should be determined. Salamanders in number sufficient to maintain correct temperature under the most trying conditions produced by a record cold snap should be provided. Heat holes in floor and ceiling forms should be properly prepared and spaced for control of covered areas above slabs. The distributive outlets from main steam lines should be placed at the most strategic points.

No matter how well protective equipment is selected, its proper use is imperative. The handling of tarpaulins should be carefully supervised. Their placing should be such that definite areas are included, with perhaps a number of sections throughout the structure treated as localized units, each having its own form of heating apparatus, this obviating risks that always attend the attempt to spread a volume of warmth over a large area in parts of which temperature is certain at times to be lowered perilously close to the danger line. Extra precautions should be exercised wherever structural safety is particularly essential.

Winter superintendence should insist upon a record of day and night temperatures, and with these should be included readings taken frequently at the bases of exterior columns and under the canvas above floor slabs, in order to prove beyond all doubt that protection is being kept at a constant level.

Contractors specializing in winter concrete have worked out well defined rules by which are determined the efficiencies of various types of apparatus used for temperature control. As examples of these, in one locality the protective efficiency of top covers on reinforced concrete



Concrete Faults Due to Improper Winter Precautions. The Criss-cross Cracks Shown Extend Clear Through the Body of the Slabs

Flat Scaling Caused by Concrete Surface Freezing Before Coverage was Applied. The Defect did not Affect the Structural Quality of the Slab

beam and girder construction in ordinary winter weather has been figured at 48 hours as standard for time before coverage should be removed, 96 hours being the minimum for side curtains. Flat slab construction, with more protection required, calls for extension of the protective period. The efficiency of salamanders has also been calculated, it having been determined, for example, that in northern sections temperatures of from 60 to 80° may be maintained by one salamander to every 300 square feet of floor. Heat holes, which permit transmission of warmed air from areas below slabs to the upper surfaces of the slabs, are figured in a similar manner. Each of these auxiliary units should permit circulation of warmed air over approximately 300 square feet of properly "topped" area during average winter weather. Should temporary radiation by steam be utilized in place of or in addition to salamanders, it also can be handled according to rule.

Whatever methods are decided on, their application to the work in hand should be understood by the architect when planning and forecasting the duties involved by winter superintendence. If unusual conditions are encountered, the plan should be flexible enough to deal with them. The thing of main importance, so far as architectural responsibility is concerned, is to be sure that the most effective forms of protection are provided and conscientiously employed. Conditions will naturally occur in which necessity of the moment may demand radical departure from original intent, and in such cases, the superintending architect must act quickly and with decision fortified by judgment. Many architects, if in doubt as to justification of a change in method, feel that the responsibility should be placed squarely upon the contractor, final acceptance being based upon tests for structural dependability.

On a recent large industrial project, a decided innovation in the protection of winter-poured concrete floors came to my attention. It may or may not suggest use under similar conditions. In this particular locality it was standard winter practice to cover concrete floors with layers of marsh hay until the set had passed all risk of freezing. In repeated cases the architectural supervisor detailed to the work found that the feet of laborers who spread the hay caused marks and depressions which actually impaired the structural quality of the finished slabs. In addition to this, tufts of hay and other debris became imbedded in the mix as it set, necessitating a "burn off" with fired gasolene before sleepers for the final floor could be placed. The supervisor had used a rather daring remedy by deliberately leaving the wet surface exposed until a skin of ice formed, strong enough to bear a laborer's weight without footprinting. Marsh hay was then applied in the usual way, thawing out the ice sheath before there had been penetration of cold sufficient to injure the body of the floor. Seemingly the only effect from this treatment was a slight flaking away on the surface, possibly to an average depth of 1-16 inch, but the architect should decide whether to allow use of such questionable methods.

Essentials on which to be satisfied in superintending the winter care of concrete are:

(1) Assurance that proper types of apparatus are on hand to provide adequate and constant working warmth for material before going to the mixer, properly warmed mixing water, immediate exclusion of freezing temperature from forms until all risk is passed by the set. (2) Assurance that all apparatus is properly placed and working.

Leaving concrete, we come to brickwork, perhaps the next most important structural element to be safeguarded. In general, the protective measures for temperature control surrounding use of concrete apply to winter brick building. Tarpaulins, salamanders, steam lines, radiation as independent units or in combination, are util-

Temperature Control Assured by Tarpaulin "Topping" of Upper Surfaces of Concrete Floor Slabs. The Manner in which Such Protection is Carried Out Should be Carefully Checked. Note the Snug Overlap Given Exterior Tarpaulins

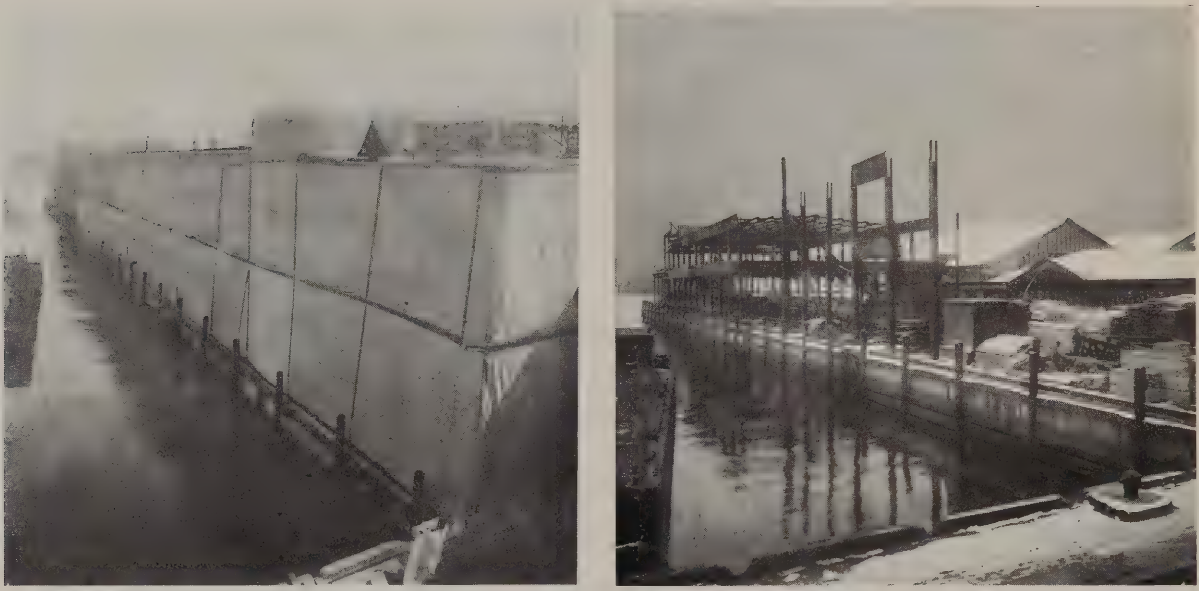
Interior View of Same Protection Shows Canvas Lashed to Framework. Clusters of Pipes Are Also Shown Projecting through Heat Holes Placed for Effective Distribution of Warmth from Salamanders on Floor Below

ized in much the same way for both materials. With brick, moisture becomes an added factor which winter protection must take into account. Wet brick for summer, dry brick for winter, is the rule. That section of the superintendence outline should begin with the storage of brick at the site. Obviously brick should not be piled helter-skelter as it is delivered from the truck, but should be stacked and covered over by sheds or canvas in a manner that protects sides as well as edges against contact with the weather. The ideal way in which to store brick awaiting use is within one of the areas kept warm by salamanders or other heating apparatus. This serves not only to keep it away from snow or rain but also prevents absorption of atmospheric moisture.

It is well established practice to lay all brickwork at temperature well above freezing point. As with concrete, the materials which go into brick mortar should be prepared and mixed where temperature control is assured.

Inside brickwork seems to offer no great problems where adequate protective measures are planned for and employed. Care in checking temperature to keep it at constant working point is, of course, essential. The desire for comfortable warmth on the part of the bricklayer is an aid in securing proper temperatures for laying brick. With brick laid outside the zones of temperature control, more closely coupled contacts are required than with inside work. Outside joints, which may freeze and "pop", carry a decided winter risk. Various anti-freezing compounds at the disposal of the contractor are valuable when speed of erection is a pressing need. Nothing, however, seems to quite fill the bill as well as good old fashioned mortar, applied with cleanly struck joints, and thin enough to permit compacting that assists in a final set which prevents there being cracking or leaky walls.

Many experiments have been carried out in an endeavor to find an ideal cold weather mortar. A test result and recommendation were published some time ago by the National Lime Association. The Association's report said that "lime cement mortars are least affected by cold weather when mixed to a formula of 1 part cement, 2 parts lime and 9 parts sand." The advantages stressed in its favor are: increase in tensile and compressive strength under low temperature; plasticity and ease in handling during winter weather; ease in proportioning; and low cost. The architect should investigate the mortar mix thoroughly. It has become widely accepted practice to defer laying outside brickwork in winter when a falling temperature reaches 34°, and to begin only when a rising temperature has reached that point. Brickwork known to have been frozen should not be built upon until most thoroughly thawed out, and portions in which frozen mortars might later cause disintegration should be torn out and replaced. Outside brickwork in



All-over Coverage Given a Municipal Pier which Was Completed on Scheduled Time Through a Winter of Record Cold and Snow. Behind the Tarpaulins, a Carefully Worked out Radiation System Provided the Requisite Heat

winter should be protected by tarpaulins for three days after laying, with temperature maintained well above 32°. So much for winter brick and brickwork as they must of necessity be treated here.

As winter construction progresses, various auxiliary structural elements begin to play their parts. Not all of them, by any means, require special winter consideration. But those in which water is used should be on the list of those that demand use of precautionary methods. More and more tile work is being used in the architectural-structural scheme of things, and when in winter its application becomes extensive, cold weather precautions must be taken. Temperature has an important bearing upon the enduring success of the winter-laid tile. Experienced tile contractors know that tiles set at or below freezing point will sooner or later come down of themselves. A conscientious rule of practice regards 50° as the ideal temperature for setting tile in winter, with maintenance at about that point for 48 hours after the tiles are in place. Work should stop immediately when the thermometer registers close to 32°.

Exterior tile work should never be carried on when there is even a remote possibility of there being freezing weather. Anti-freezing compounds are not very popular with most tile men. Those with whom I have talked discourage their use, claiming that results have not been satisfactory and that staining of the tile face is likely to occur. Tile body, like that of brick, absorbs moisture readily, and in winter, tiles should be kept as dry as possible before application, within areas where working temperature is maintained.

Plastering is another phase of work which should be safeguarded against too low a temperature. Luckily, plastering is usually done when winter construction has reached the semi-finished stage, when necessary temperature is easily provided and kept constant.

With a clearly defined plan of procedure to follow, effective winter superintendence is not difficult for the thoroughgoing architect. The measure of its success depends largely upon having a clear idea of what is to be encountered, of knowing in advance the reactions of given materials to winter conditions if left to themselves, and of knowing what must be done to prevent these reactions from taking place.

In an article such as this some mention should be made of the effect of winter superintendence upon the attitude of the craftsman toward his work. The success of winter construction is not wholly dependent upon adherence to rules and standards for the storage and handling of material. Securing the comfort, safety, and team spirit of the men who do the work, from the pick and shovel gang on up the line to division foremen, should be a substantial part of the architect's superintendence plan. In his contacts he should be on the alert for any difficulties which might impair morale, and be quite as frank with recommendations for their correction as he is in matters of purely structural interest. I know the stimulus which follows an architect's mingling with rank and file of workers on a cordial common ground; the impetus that follows his showing more than an impersonal interest in a craftsman's efforts; the support he receives when it is understood that he is there to do his part in creating a structural success for everyone concerned.

BUILDING PROMOTION FROM THE BUILDER'S STANDPOINT

BY

WILLIAM A. STARRETT

WHAT THE TRUE BASIS OF PROMOTION SHOULD BE. FINANCING METHODS, GOOD AND BAD

IT is needless to say that I was flattered to receive an invitation to come to Chicago, particularly to speak to architects. We in the East feel that the leadership in sound promotional ideas comes out of the West.

One such idea is that of financing buildings by the issue of so-called "leasehold bonds." In the State of New York, and I believe in two other states in the Union, securities that are founded on leaseholds are not accepted by fiduciary institutions as investments for trust funds, thus limiting the use of this method of financing, which is, when soundly planned, about the best and most advanced form of real estate security.

There is a legitimate and alluring field of endeavor for those interested in architecture and building in connection with the financing of building projects. We builders and architects hear of and see many that are meritorious. We know the great increment in value that comes about through our active participation in worthy projects. It is well, however, to remember that we hear most of the successful cases of building promotion, and that very little is said about the unsuccessful. We can always point to examples where great profit has accrued; but we should not forget that the path of this whole matter of promotion is strewn with wrecks of failure, and that bankruptcy courts silently carry on, without front page publicity, the foreclosure enforcement of liens.

Land Worth What It Can Be Made to Produce. Now the true basis of promotion is really the putting together of two valuable components of a creative enterprise. We have on the one hand a piece of land, either vacant or encumbered by obsolete buildings that must be destroyed in order that the land may realize its economic value; and we have on the other hand a brilliant conception of a great improvement which might be made,—the land to be worth so much and the building erected to be worth so much. The sum of those two will be so much; and no matter what it costs, within those reasonable limits that we here discuss, there has been an increment the minute the key turns in the doorway it is opening. Therein lies the lure to the promoter and the legitimate profit in the thing we are here considering.

Now, here is a thing builders and architects are tremendously concerned in, because we help to create that happy combination by bringing together an unproductive or absolutely unimproved piece of land and the highest possible improvement for that piece of land. It would be an impertinence in the presence of real estate experts to suggest a short cut in the matter of appraisals, for we have all used land appraisals of other generations and running down even to very modern times;—that method of calculation which compares what another piece of land cost with that of land under consideration, without reference to the earning power of the newer project. Out of such a circumlocution of appraisal, we finally come to the solemn moment when the appraiser grudgingly says that our project is worth only about so much. However, I dare to pronounce a bit of dictum as a short cut for the whole thing, by saying that land is worth what it can be made to produce. If you want to be very meticulous in your definition, you may go on to say: "What it can be made to pay over a period of years"; but it is all said in those few words;—land is worth what it can be made to produce,—its earnings. And therefore the builder and the architect, in their skillful, constructive activity, create a part of that increment.

"Cost" and "Value" Defined. Now, this brings us to the crossroad which might be regarded as a dilemma, and sometimes taxes the consciences of us who may not think carefully and cleanly (I should say clearly) in these matters. The difference that must be recognized, and the first thing, is the difference between *cost* and *value*. Cost, however, is the sum of those actual outlays of cash necessary to produce and complete the whole; that is cost of the operation. The value of the operation is the complete thing,—the cost increased by creative effort that has been put into the operation by the work of the builder and the architect.

The Wrong Sort of Promotion. Promoters are of so many different kinds that one must almost define it every time he uses the word. Considering that type of promoter whom I should describe as reckless, but who calls himself a conservative, we think of him as reaching down into the very bowels of the building business, and with prospective values and deferments in payment, he ponders on that as a possible ground upon which to build his slender project. He thinks of engaging the efforts of the architect and the builder, and then reaches over the shoulders of both and proposes to engage the profits and the support of all the subcontractors involved. I have found this to be the case,—I am not speaking of territory with which I am not familiar, but in my own part of the country we find that the greatest mistake among promoters is that which leads a promoter to think that he can reach over the shoulders of the architect and builder and assess the subcontractor for a large percentage of the cost of the work. Here is the way that thing works, speaking for my own part of the country. Take items like structural steel, elevators and perhaps one or two other major items, and you find concerns vending those materials are able to take any part of the financing they say they will take. It is also to be observed that they carefully scrutinize the terms, and prices generally run correspondingly high. Beyond that, there is in the whole industry running down the line, a tendency to lean on the architect and the general contractor for advice, or rather for assumption of advice, concerning the taking of securities. There are 50 or 60 or sometimes as many as 75 subcontractors that enter into the making of a large, complicated, metropolitan structure. You have a great army of those people, ready to take any kind of paper offered, as a portion of their profit. Now what happens? If I could show you into the treasury departments of a dozen of the leading builders of this country, you would find a very sinister state of affairs. You would find there men who promised to take anything in the way of paper and deferments, who are suddenly confronted with the fact that, after all, arithmetic on their books will not produce dollars,—and this is one of the fruitful sources of bankruptcy. Men not skilled or versed in this matter of deferred payments agree to take almost anything, and thereby damage and demoralize their own industry by these rash promises, which, of course, meet a judgment day sooner or later. I think, therefore, that one of our pernicious growths in this matter of promotion is the feeling that there lies, in the subcontractor, an almost untapped source of wealth. As a matter of fact, it doesn't lie there at all. It is detrimental and pernicious to undertake to extract by means of promises of subcontractors, part of the financing requisite for such operations.

We all know, in this swift transition that has passed through the business, that borrowing is necessary for metropolitan development, and indeed it has become one of the fundamental sources of our strongest outlets for capital. Insurance companies for years made loans when skyscrapers were early being introduced; they did it with a considerable amount of what they then thought was risk. It has turned out, of course, as we know now, that there was no risk to it. Nevertheless, there is every credit due to those early institutions for the courage and forward-looking point of view that made possible the financing of these earlier constructions, when, as I have said and as many of you remember, buildings of even 12 stories were regarded as dangerous. More recently in the development, however, we have come upon the investment banker, or rather he has come upon us, and he has come out of a certain situation. In moments of pessimism I sometimes think no new idea ever entered the minds of the comptrollers of insurance companies after the year 1900. The absurd point of view, arising out of that ancient fetish that occurred with the first skyscraper and was met by the courage of that time, has made the lender feel that he is extending a tremendous favor to the borrower, even though the security were as high as it is in conservative lending. Of course, being of that class which benefits by borrowing, I naturally whoop it up for anything that produces larger loans. Nevertheless, I want to say that there is a responsibility there that I think has never been squarely met by the so-called orthodox lending institutions, and that is this responsibility: When an owner (and let's call him also a promoter, because we are also speaking of that) has found a project meritorious, creative, needed and necessitous, if you please, and goes to an orthodox lending institution, and is told that his estimates are too high and that the architects' fees ought to be cut, and that his allowances for this and that and the other thing should all be pared down to arrive at a figure which is not only the cost but something below the cost; then when the loan is made on that basis, with no creative vision, and the owner is forced to the very edge of his financial scheme (and it is not without historical record that often an enterprise entered into hopefully by people intending to avail themselves of loans, has actually been wrecked through the very paucity of the loan, where a proper, forward-looking, optimistic view of the merit of the project would have given a better loan, without one particle of disparagement of the value of that loan or its security), then, I say, the lender has much to answer for.

Investment Banking. Of course we know that out of that situation we have evolved the "investment banker." He has been the subject of all kinds of speculation. We have even had one or two go to the wall, but it is no more an indication of unsoundness of investment banking than the failure of a single bank is an indication of the unsoundness of our banking system. What really happened was this:—that out of this lethargic situation of old time lending there was created an institution that would come in with vision and foresight and see the potential value of putting together the vacant land and the completed structure. That situation produced, our investment banker has rendered an inestimable service to architecture and the building industry. Cities everywhere have been benefited by the splendid vision and foresight of those investment bankers; and if we can point to an occasional failure, we can also point to a great number of successes.

Sound Projects Should Be Encouraged. We are here together at least for one brief evening, taking to ourselves the virtue of being creators, and it seems a proper occasion to make a mighty protest in favor of the reliable, well organized, capable architect and the builder. These people, as I have said through the burden of this talk, do a great creative thing. It is scandalous that they should be subjected to the losses and disappointments and be pushed out on the end of the limb at the very last quarter of these creative enterprises, in reality and truly carrying the burden of the risk. That's what happens when you put your fees in as part of the enterprise. There is a mission in the whole architectural profession. The architects and the builders are really doing a creatively helpful thing and are entitled to a rightful share of the emoluments of the project by reason of their having taken the great risk involved. We can almost talk unionism when we get on that subject, though we are not going to do it; but I say, as of other matters connected with the ethics of these two professions, that there is no greater field of effort, no more fruitful field of effort, than the constant, everlasting harping on that particular thing, and a demanding on behalf of architects and builders, of a fair share of emoluments of the enterprise, they having really assumed the major risk therein.

This business of promotion is also new; just think of it! We can all hark back to those days, here in Chicago, when a 15-story building was really a city wonder. The evolution and metamorphosis of the whole industry have precluded the possibility of getting down to a code of standard practices, but I think the time has come, and in fact enough has been developed out of the many great metropolitan structures that have already been built, for us all to find out what the standards,—at least the major standards,—of practice should be. It starts with questions of credit, questions in which bankers can help, questions in which realtors and bankers can take a sympathetic interest. Their attitude toward the high ethics of these two professions will in the end tend to stabilize the business. We want promoters. A promoter is a most valuable factor in the economic forward progress of this country. The wrong kind of promoter is just as wrong as you want to make him, and the good, legitimate producer, who sees the values to be created by putting together the unimproved land and sound, well-thought-out building projects, is an asset and and institution of great value to us. My whole urge in the matter is this: With these fundamentals perhaps a little better understood, there could be no better objective for all of us concerned than to stand out for a higher, more ethical and properly fashioned standard for promotion; for the exposing of flimsy, unsound promotion and enterprises.

There is a back-kick in all of this promotion business, which need hardly be referred to. It is the last straw that always breaks the camel's back. Builders have an old saying: "All money lost in building is lost in laying the thresholds." That has particular significance with reference to unestimated items such as delayed receipts of rentals, unexpected necessary expenses that come up in connection with renting, etc., disappointments that are only temporary, in connection with renting during the first months of a building's occupancy. We must consider not only the value created between the cost of the vacant lot and the finished building, but also those items of expense necessary for the closing of that last gap, and the provision for them demanded of the promoter, so that those investments we make of our fees and time in the equity, will be productive in accordance with the great effort which we put into it.

EDITOR'S NOTE. This article by the vice-president of Starrett Brothers, New York, is based on his address recently given before the Chicago Chapter of the American Institute of Architects.

THE PAINTING PROBLEM AND ITS SOLUTION

BY

W. C. WOODYARD

HIGHER standards in living conditions have demanded a correspondingly greater refinement of finish and decoration. Whether it be the home, the school, or place of business, we find ourselves taking a fleeting, momentary pride in its exterior architecture, while living all day inside with decorated walls and woodwork. These may produce a refining influence, foster *esprit de corps,* and inspire pride, or the opposite reactions,—disappointment and depression. The value of this idea is well illustrated in the modern skyscraper. Almost without exception the 35 fine Chicago office buildings built in recent years have been trimmed in genuine mahogany or walnut. Almost without exception, the wood carries a highly polished, piano cabinet finish. One of the largest leasers of Chicago loop property, in specifically demanding a piano-like finish, declared it to be one of the differentiating marks between an "A" and a "B" class building. This trend toward refinement of finish and decoration in the office building, the theater, the school, and particularly in the modern home, is so evident as not to require elaboration. The value of attractive and effective surface protection is accepted. It is easy to visualize the result desired, and comparatively easy to define what is expected, but the problem of getting these results is a matter of interest if not of perplexity to the architectural profession.

It is the purpose of this article to analyze the factors contributing to this perplexing situation, with the hope of suggesting a tried and proved policy which will insure more uniformly satisfactory results. With proper procedure, we may deal, first, briefly with the situations which reflect lack of understanding and thoroughness, and secondly, more comprehensively, with the situations in which apparently sound theory has not vindicated itself in practical results. Careless and unstudied specifications deserve only passing mention. Obviously, it is only human that a painting contractor would readily take advantage of one who reveals an inadequate knowledge of requirements. Such specifications lead to costly bartering on the job,—bartering in which the architect and the client invariably lose. We are not warrented in condemning painters as a class, and assuming dishonesty on their part. The whole problem is frequently dismissed in this manner, and unfairly so. We shall make more constructive progress, for the purpose of this discussion at least, if the architect assumes responsibility for the situation and for the improvement thereof.

It is recognized that no trade offers the possibilities for evasion, substitution, and dishonest practice that the painting trade does. Sufficient reason, therefore, to tighten up all along the way in the method of specifying, contracting, and supervising painting work. This is the only way to give the better contractor, who takes a pride in his work, a chance. In general, pride in workmanship is an inherent quality in all of us. It is unreasonable and unfair to assume, therefore, that the painter is not motivated by a desire to do good work. If, however, there is evidence to the contrary, and one will search deep enough for the cause, it will freqeuntly be found that the painter is forced by circumstances to depart from his ideal in order to survive. The better painting contractors will welcome the tightening-up policy which will enable them to do a type of work more satisfactory to all concerned. The "human factor," or the reaction of the painting contractor to specifications and superintendence, is all-important in considering this problem. The painter is a very human, understanding sort of fellow. As a matter of fact, when he makes up his bid he usually has to take into consideration three things,—first, the plans and specifications; secondly, the architect involved, and what he is likely to exact or fail to exact; and thirdly, how far his competing bidder is likely to go in discounting both of these factors. Too often, instead of being given a definitely lined-up proposition, the painter is asked to gamble in competition with others confronted with the same alternative. The general contractor contributes to the unsatisfactory situation by seemingly being interested only in the lowest possible figure, and the only hope for the trustworthy painter lies in a more careful definition, enforcement, and discrimination among painting contractors on the part of the architect.

Now, we may logically turn to certain constructive suggestions which a broad survey of painting problems reveals as the more outstanding causes for unsatisfactory results. Specifications should be varied according to the cost of the building and the general line-up of the investment. A greater proportionate decorative expenditure is expected, for example, in a $60,000 residence than in an ordinary apartment building yielding a moderate income. In the latter case, a decorative result approaching in appearance the effect secured in the $60,000 residence is desired at a considerably smaller expenditure,—and it is possible to secure it. However, the curtailed specification is usually more difficult to write. The element of serviceability is necessary to both projects. It is true, and generally so accepted, that there is no economy in letting down on the quality of materials used. This would result in a very negligible saving,—a saving that would prove very expensive in the long run. The quality of materials, in fact, looms more important in the curtailed job. A five-coat rubbed enamel job may be cut down to a four-coat eggshell or a three-coat enamel job if necessary. The proper selection of coating in a three-coat enamel job is very important. Likewise the size, three coats of paint, glazed and starched wall coating job may be cut down in the extreme case from six coats to two coats,—a coat of primer and a coat of paint. In each instance it is not claimed that an equivalent job is secured, but a decorative effect approximating the more perfect finish is had, and if the best materials are used, it is one that is reasonably durable and serviceable. On a large apartment hotel recently, an architect wrote a curtailed painting specification, specific as to requirements in coats and materials, that was practically fool-proof. He emphasized to the six contractors he had bid on the work that it represented exactly what was wanted. There was less than a 7 per cent differential between the highest and the lowest bid. It is not an uncommon experience for the highest figure to be double the amount of the lowest figure. This represents a pretty large difference in appraisal of what is desired or will be exacted. It relegates the bid to a gamble. It represents a rather important need of the "tightening-up" process heretofore alluded to.

The practice of cutting bidders down to a price, likewise offers a poor investment. We need not expect to get more than we pay for. It is far more logical and business-like to change the specification, know exactly what one is going to get, and be in a position to insist on the terms of the contract. Of all the evils in connection with the painting problem, the one most complained of is substitution of cheaper materials for those specified. This may be done in an underhanded way, such as displaying boldly a few cans of the specified materials and actually using cheaper materials from barrels, refilled cans and the like, or it may be more above-board,—in out and out requests for approval of other goods. In the latter event, regardless of how represented, the material offered for approval is practically always cheaper in price and quality.

We must first look to the specifications for improvement in this regard. Here again, the human factor plays a prominent part, and the manufacturer's representative can play a constructive role. Let us trace the reaction of various types of specifications. First, consider the specifications calling for several brands "or equal." On the face of it, it appears theoretically sound. It is intended to leave the matter open to competition.. It must be recognized, however, that materials such as paint, varnish, enamel and lacquer, with their complex chemical make-up, are not "equal" in quality or performance. The paint industry exists on a highly scientific basis necessary to meet the ever-increasing demand for a greater variety of paint finish. Products made from the same basic ingredients frequently differ widely in qualities of finish and durability. The large expenditures for laboratory research and control, which constitute quite an item in this age, have found their justification in a greater refinement of finish, flexibility of use, and durability of results. A manufacturer establishes a reputation for progressive research and integrity of purpose. Competition in quality fosters research, whereas an accepted theory of equality would prevent progress. Added to that is the fact that usually one or two of the brands included are cheaper, which automatically makes them the standard of materials for the specification, and nullifies any value in including the higher priced brands. Furthermore, it tends to eliminate possible coöperation from the manufacturer's representative. The representatives of the manufacturers mentioned may be successively stalled off if the contractor chooses to be evasive. In any event, the salesman selling the job, whether it be of the grades specified or otherwise, is entirely indebted to the painter for the business and is likely to be in no position to coöperate effectively with the architect in the interest of the finished result.

We may go from this type of specification to the other extreme. Unquestionably, the exclusive specification offers the most definite proposition for the bidder; likewise a definite basis, an obligation in fact, for the manufacturer's representative to interest himself in the result which should be secured with his materials under the provisions of the specifications. This system has proved to offer the best investment and protection for the client. The plan, however, is objectionable to many because it does not leave the matter sufficiently open to competition. It is frequently maintained that the manufacturer would use this advantage to hold up the price to the contractor. That contention, however, is not substantiated by fact, and where made it should be carefully run down. The larger manufacturers have so many jobbers and independent, overlapping methods of distribution in the various communities that they create competition within their own representatives' ranks and make it practically impossible for the painter to be held up on price. Furthermore, it would not be sound business tactics for the enlightened, reputable manufacturer in this age to be so shortsighted as to take advantage of an exclusive specification if it were in fact in his power to do so under his distributing arrangement.

However, if we seek a specification that offers a uniform standard of materials for each contractor to bid on, which provides for competition, which definitely eliminates the bartering for approvals after the contract is let, let us consider this plan. Definitely specify the product which you believe best adapted for the work, as you would probably do if you were writing a specification for your own home, incorporating as a part of your specification these clauses: "The bids to be considered must include a bid on goods herein specified, but the contractor may submit alternate bids on materials which he considers fully equal to those specified, provided he appends the name of the manufacturer and explicit designation of each product he offers as a substitute, stating the amount to be added to or deducted from his bid for such substitution. The architect reserves the right to award the contract to the lowest bidder on the goods specified or on any accepted substitutes proposed in the alternate bids submitted as just explained. After the award is made, no substitution of materials for those mentioned in the accepted bid will be permitted."

The basic bid on the standard set up commits all contractors to one figure on exactly the same thing, permitting a fair comparison of figures. The architect is not put on the defensive, later on after the contract is let, with requests to approve this or that material, the purpose of which request is usually to offer a saving to the contractor. If there is a saving to be made in the use of an alternate, architect or owner should get the benefit of the saving. How often is there an allowance offered with the request for an approval under the open specification? Furthermore, the matter is definitely settled when the contract is let. The numerous time-consuming requests for approvals are obviated. It is not left to the superintendent on the work to pass on materials, as is frequently the case. Best of all, it is a protection to the better element among the painting contractors who prefer to use the better grade products but hold mental reservations regarding the grades of goods some of their competitors would try to put across if they got the contract.

We cannot deal comprehensively with the painting problem without some reference to superintendence of the work. The plan and specifications may be worked out most painstakingly, and their effect be completely lost, as is so often the case, by laxity and lack of system in their enforcement. We cannot hope to deal with the subject of superintendence in an entirely adequate manner in this article of small extent, but these suggestions to the architect's superintendent may prove helpful:

(1) Definitely familiarize yourself with the scope of the specifications, particularly as regards to coats and materials.

(2) Learn definitely from the office what materials are to be used if the specifications are not explicit. Check up definitely with the office any details regarding which there is uncertainty, such as color, decorative schemes, etc.

(3) Make brief outline of specifications in your note book, particularly the sequence of coats and materials to be used.

(4) Go over the specifications and details of the work with the painter when he first comes on the site. It is essential that both know that each understands that which is to be done.

(5) Provide the painter with a room for storage of painting materials, retaining a key to the lock of the door.

(6) Make regular inspections of storage room, taking care to identify contents of unlabeled cans. Reject and have removed immediately from the site materials not in accordance with the specifications. Look for the original seals on goods.

(7) In the early portion of the work, observe opening of a new can and application of each coat for at least one room to establish a standard result for the entire work.

(8) Check painting work regularly, requesting information as to the particular coat being applied and record data in note book for later use.

(9) Be as careful in the check-up toward the end as at the beginning.

We have made only scant mention of the manufacturer's representative, and the part he can play in improving painting conditions. If he is a product of the modern school, which increasingly demands a more thorough and technical knowledge of the business, he can prove to be quite an asset. Ask him for suggestions in connection with specifications. If you are specifying and using his products, feel perfectly free to insist on his following up the work and coöperating in getting a creditable result. You have a right to expect his interest to be more than in a sale of gallons of material; he should be interested in selling results.

We have gone to some length to suggest a tightening-up process as a means of improving painting work. We have suggested taking into account the human factor and making it more difficult to discount the intent of the specifications. These steps are necessary if the better element in the painting contracting business is to triumph. The better painting contractors will give a sounder investment, and will give added meaning to the common slogan of the paint industry: "Save the surface and you save all!"

SOUNDPROOFING APARTMENT HOUSES—PART ONE

BY

V. L. CHRISLER
ASSOCIATE PHYSICIST, U. S. BUREAU OF STANDARDS

SOUND insulation is one of the most important details to be considered in building hotels, apartment houses, and office buildings. In the past little consideration has been given by architects to this necessary requirement. There is, however, on the part of the people who occupy these buildings, a growing demand for sufficient sound insulation to ensure a reasonable degree of privacy. Sounds which come through the ceilings are especially annoying to the person hearing them. In many cases the noises coming from adjoining apartments finally get on the nerves to such an extent that a tenant moves, though his apartment may be satisfactory in all other respects.

Up to the past four or five years there has been little reliable information available on this subject, and our present knowledge as to what is the best type of construction is somewhat limited. Many people have thought they had a perfectly satisfactory type of construction, and some buildings which they completed were pronounced satisfactory. Possibly the next building, which was constructed as nearly as possible in the same manner as the others, would be a complete failure. On account of this uncertainty and in order to get comparative data on different types of construction, the Bureau of Standards several years ago constructed a special building (Fig. 1) in which measurements could be made determining numerical values for the sound insulation of different types of construction. Most of the common types have been tested, and considerable work has been done in making various modifications in wall and floor construction so as to get the necessary degree of sound insulation. The problem as a whole is very interesting, as there seem to be so many unknown quantities that it is generally impossible to predict with any degree of certainty whether or not a partition will be a better sound insulator if certain changes are made in it. Owing to the work which has been done during the past three or four years, it is possible to make a much better guess than when the work was started,—but there are still many elements of uncertainty.

It may be of interest to consider some of the factors which enter into the transmission of sound through a partition and to see how they may be controlled. To begin with, suppose we consider a sheet of metal which is fastened over a hole in a wall. If a source of sound is placed on one side of this sheet of metal, the sound energy is carried to the metal by the air, and the sheet is set in vibration. This in turn sets the air on the other side in vibration, and the sound energy is thus transmitted from one side to the other. By studying the sound transmission through a number of sheets of different metals, it has been found that the weight per unit area is, generally speaking, the most important factor. It is not the only factor, for a sheet of lead will transmit sound more than a sheet of iron or aluminum of the same weight. This difference is not large enough, however, to be of much practical importance.

In studying these thin sheets of metal, a very surprising result was found. A year or so ago a few double masonry walls were built and were found upon test to be quite effective as sound insulators. In fact the conclusion was reached that air was the best filling material. Sabine also reached the same conclusion. From these results it was then expected that two sheets of metal separated by an air space would be a much better sound insulator than a single sheet of metal. Much to everyone's surprise, it was found by experiment that two sheets of aluminum with a 1¾-inch air space between them transmitted almost as much sound as a single sheet of material. It thus became evident that the behavior of a double masonry wall was different in kind rather than in degree from that of a partition composed of two thin metallic sheets. The thin sheets of metal apparently need something in the air space between them to help damp out the vibrations. Filling materials, such as hair, felt, cotton and balsam wool, were tried and found effective.

From these results and other measurements on walls, there may be drawn some conclusions which appear to be more or less general. As long as a wall is constructed of masonry and is more or less homogeneous, the sound insulation is almost proportional to its weight per unit area. This means that to get a proper degree of sound insulation the wall must be excessively heavy. To avoid this we may split the wall into layers, and in some way try to damp out the vibrations and prevent them from passing from one layer to another.

One such method which has been devised is to hang the wall and ceiling surfaces on springs which are attached to the main part of the wall. The springs are supposed to act as do shock absorbers for an automobile. They must be of just the right strength and stiffness, so that the wall surface can vibrate without transmitting too much energy to the main part of the wall. This principle was illustrated in some of the first measurements that were made at the Bureau of Standards on stud partitions. One partition was covered on both sides with expanded metal lath and a very thin scratch coat of gypsum plaster. The second panel was as nearly identical as possible, except that it had both a scratch coat and a brown coat of gypsum plaster. When the measurements were completed, the results were found to be somewhat surprising. The panel with the scratch coat only was found to be the best sound insulator. An examination of the two panels showed that the panel having only the scratch coat had a surface so thin that it had no rigidity and could easily be moved back and forth between the studs for perhaps an eighth of an inch without exerting an appreciable force on the studs. The panel having both the scratch and brown coats had a more rigid surface and could not be moved so easily; hence a force exerted on this surface was also exerted in considerable measure on the stud, and was thus transferred to the other side.

The reasons are now apparent why the scratch coat was the best insulator. It had sufficient mass in its surface to prevent the sound setting up vibrations of sufficient force, so that the air between the studs would act as a good tie, as in the case of thin sheets of metal; also the damping in such a surface is fairly large, and the energy would not be carried very efficiently to the stud and hence to the other surface. Moreover, what little energy was carried through was not sufficient to produce any great amount of vibration in the other side, as the movements produced in the stud were but slight, and the opposite scratch coating was not stiff enough to be set into vibration by small movements of the stud. In the case of the panel having the scratch and brown coats, the sound waves which set the first surface in vibration caused the second surface to vibrate also, as this surface was stiff enough to form a rather rigid connection with the studs and thus could be put into vibration by a small motion. From this experiment we see that if the surface can be attached to the main part of the wall so that it is free to vibrate without transmitting too much of the energy to the wall, we have an ideal condition. To accomplish this, one company which is specializing on sound insulation, is supporting wall surfaces on the special spring mentioned here. By another method which is on the market the wall surfaces are supported on small metal chairs, which are lined with felt. In addition to this a lining of hair felt is used between the main wall and the plaster surface. Neither of these particular types of construction has been tested by the Bureau of Standards, but it is expected that either should give good results.

A special type of masonry wall which has been tested in several different combinations by the Bureau of Standards, and which promises to give very satisfactory results at relatively slight increase in cost over ordinary construction, consists

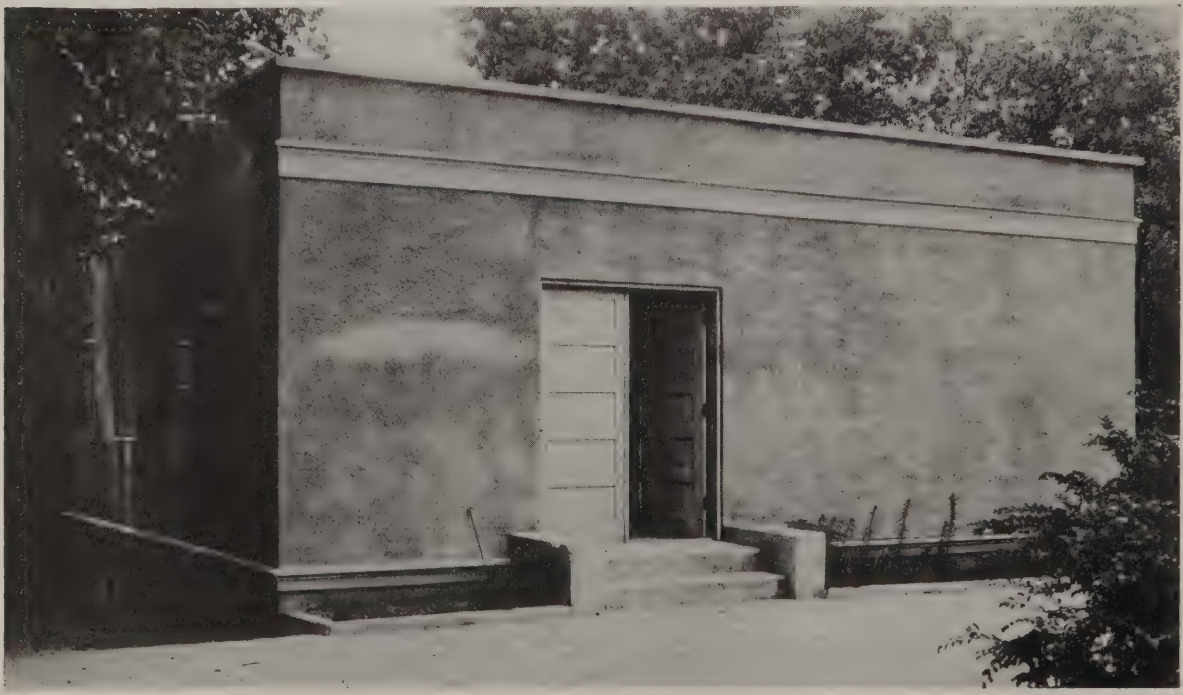


Fig. 1. Special Building of the Bureau of Standards for Testing Sound Insulation.

of a masonry core of 4-inch hollow clay tile or brick turned on edge for the center portion. If the wall is a load-bearing wall, a heavier construction could be used and probably still better results be obtained. At the time the masonry wall was laid, wires were placed in the wall so that wooden furring strips could be tied to the wall 16 inches on centers. The plaster base was nailed to these furring strips, and plaster was applied in the ordinary manner. For the plaster base expanded metal lath was used with tar paper behind it to prevent the plaster from forming a bond with the masonry core. Two different kinds of fiber board and a gypsum plaster board were also used as a plaster base. Where there was a direct comparison, the fiber and plaster boards showed a slight advantage in sound-insulation value over the metal lath as a plaster base. This difference was not large enough to be of much importance, and was probably due to the fact that the plaster was only half an inch thick over the boards while it was seven-eighths of an inch thick when metal lath was used, and as a result gave a somewhat heavier surface.

When the panels were in place, conversational tests were made as well as a determination of the reduction factor. In every case it was found that a conversation carried on in an ordinary tone of voice was barely audible to a listener on the other side, provided he was listening intently, but that he was unable to understand anything that was said; also that if there were the slightest noise in the room he was in, the listener failed to detect any sound from conversation on the other side of the panel. Attempts were also made to carry on a conversation through these panels by shouting. In this case one could always hear the other person, but as a rule failed to understand anything that was said. Compared with the walls in many apartments, this is a decided improvement. It should also be borne in mind that the rooms in which these tests were made had bare concrete walls and were so situated that no distracting noises entered from the outside. If they had been rooms in an ordinary apartment, where there were draperies and furniture to absorb part of the sound, and if there had been some noise due to traffic or other causes, the panels would have given still better results.

A very interesting illustration of the effect of absorbing material was found when a box was built and lined with some very absorbent material. There were some plate glass windows in the box, and when a person was on the inside his lips could be seen to move, but as a rule unless he raised his voice slightly no sound could be heard. The person on the inside, however, could hear every word said by anyone outside. A practical use of this might be made in offices where typewriter noises come through thin partitions and are annoying. If considerable material is placed in the room where the noise originates, it is sometimes possible to reduce the intensity to such an extent that the partition becomes satisfactory, and the noise is no longer disturbing. There is also a second advantage to use of such a treatment. The intensity of the noise being reduced makes the room much better for those working in it. Where tests have been made it has been found that this increases the efficiency of workers.

Up to the present we have considered only air-borne noises. Noises due to impact form another class. They are among the most difficult to insulate, and are at the same time highly annoying. From experience we all know that a noisy machine often sounds almost as loud in the room below as in the room where it is located. To experiment with noises of this kind, a special machine (Fig. 2) has been built by the Bureau of Standards. It consists of a set of five rods which are raised in succession by a set of cams. The speed of the cams is such that one rod is allowed to fall every fifth of a second. On a wood floor it is quite noisy—sufficiently so that it is rather trying to hold a conversation with anyone in the same room. Where there were wood joists there was some reduction of the noise transmitted through the partition, but it was still decidedly annoying. Some contractors build a so-called "floating floor" by using a fiber board, and then laying the finish floor on top and nailing through the fiber boards. This form of construction was tested to determine if such a structure was an improvement, and somewhat to the experimenters' surprise (although the results might have been expected), the structure transmitted exactly the same percentage of sound within the limit of experimental error as did the

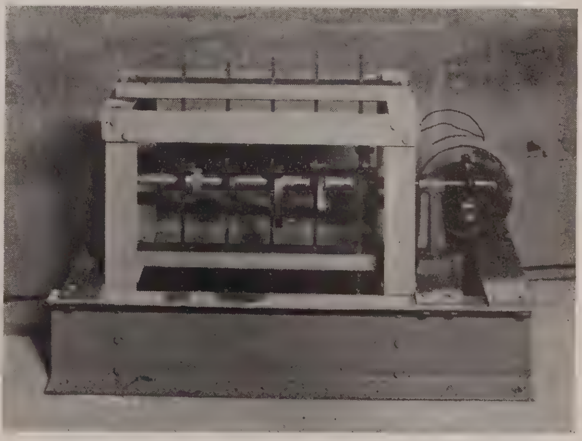


Fig. 2. Machine for Experimenting with Impact Noises.

structure before the fiber board was added. In other words, the vibrations were carried through the nails and destroyed any effect due to the fiber board. This applies to both air-borne and impact noises. In the next attempt a rough subflooring was laid and on top of this was placed fiber board, on which nailing strips were placed, and on this the finish floor. This will be referred to as a "floating floor." Details have not been worked out as to how these nailing strips should be fastened, but it is not believed that it will be difficult to do this and still preserve what sound insulation is gained. For air-borne noises, such a structure is quite satisfactory. Under usual conditions a conversation carried on in an ordinary tone of voice is not audible through it. For impact noises, however, the structure was rather disappointing. It was to some extent an improvement, but footsteps could be easily heard.

The next attempt was to separate the ceiling from the floor joists. This gave about the same results, although not quite as good as the single set of joists and floating floor. A floating floor was then added. This combination gave the best results that were obtained with wood joists and was very satisfactory as far as air-borne noises were concerned. It still needs improvement in regard to insulating against impact noises. In fact, at this point in the investigation the conclusion was almost reached that the most practicable way to prevent noise coming through from the floor above was to minimize the noise being produced. This can always be done by using carpets or rugs. Cork tile and rubber tile are also good, and even linoleum is much better than a bare wood floor. After considering this type of construction still further, it is hoped that possibly some type of double ceiling will help and that it will be possible to prevent ordinary impact noises from coming through and being annoying. Further work will be done along this line in the near future.

The other type of flooring which was studied was masonry. When impacts were allowed to fall directly on the masonry, the noise in the room below was practically as loud as in the room where the machine was situated. A floating floor was then added, with decided improvement. Finally a suspended ceiling was placed, and this gave the best results which have been obtained. For air-borne noises this is probably the best panel that has been tested. For one of the listening tests a radio loud speaker was used. The loud speaker was driven somewhat harder than is usually customary for home use, and even then when listening through the panel it was impossible to tell whether someone was talking over the radio or an orchestra playing. In fact it is doubtful whether a person could have been sure that the radio was going. It is certain that if the test had been made anywhere except in a room which was absolutely quiet, the radio could not have been heard. For impact noises it was not as good, but was quite an improvement. The noise from the impact machine was distinctly audible, but not loud enough to be readily noticeable if two people were talking in the room. A practical method of fastening the nailing strips remains to be worked out, as in the tests just described, they were simply laid on the fiber board. From some experiments on brick walls it is believed that these strips can be nailed or lagged to masonry at intervals so as to prevent their bowing up without affecting the sound insulation.

From all this it is evident that the best form of sound insulation for masonry which has been found would be constructed somewhat in this way. What might be called the "core" of the building would be built in the customary manner, that is, with the walls and floors of masonry. From this point the procedure would be different. Each room has been formed by this rough masonry, and inside of this the finished surfaces are to be built. Instead of plastering directly on the masonry to form the wall and ceiling surfaces, this part should be furred out so that the finished plaster surfaces are not in direct contact with the masonry. In the same way the floor should be of a floating type. In other words, we might picture it as a box within a box, the inner box being attached to the outer in as few places as possible, and these connections should not be any more rigid than is necessary. Exactly how these connections should be made to get the best results is rather a difficult matter to decide and needs more investigation.

For wood construction, the progress has not been as encouraging as for masonry. This is possibly due to the fact that sounds do not pass through most types of wood construction as easily as through masonry, and therefore the incentive for improvement has not been as great. Use of staggered studs and staggered floor and ceiling joists has been suggested as a good method of construction. The laboratory tests do show an improvement in such cases, but not as large as was expected; and it is a question whether the improvement is sufficient to justify the additional cost. Another method is to use fiber board bebetween the studs and lath. The improvement in this case was not as great as had been hoped for. Work is still being done along this line, and it is hoped that a satisfactory solution will be obtained which will not necessitate an expensive installation.

In all of the laboratory work done, one important factor has had to be ignored, and that is water pipes, soil pipes, electric conduits, gas pipes, etc. All of these form excellent paths by which sound may travel, and they may frustrate all attempts at sound insulation unless care is taken to install them properly. One suggestion might be made about noisy water fixtures. To begin with, a fixture should be bought which is as quiet as possible. Even then fixtures are often noisy if the water pressure is quite high, and considerable energy has to be dissipated as the water flows through. This often sets the fixture and with it the pipe in vibration which can be heard in all of the adjoining rooms. It is practically impossible to insulate against such sounds, but it is relatively simple to prevent their being produced by installing a reducing valve where the water enters the house and reducing the pressure so that it shall not exceed say five pounds per square inch at the fixtures. To secure a good flow of water this necessitates a somewhat larger pipe than usual. Doors and other openings also present problems which have to be dealt with according to their individual cases. Ventilation pipes also present problems. One rather costly mistake in planning an apartment building came to the writer's attention. The bathrooms were built directly over one another. As there were no outside openings, the ventilation was taken care of by a shaft into which there was an opening from each bathroom. As a result, a person standing in one bathroom could hear everything that went on in all of the other bathrooms, since the ventilating shaft acted as a speaking tube. As a result of this the owner was unable to keep tenants in the apartments, and he has spent several thousand dollars trying to remedy this faulty construction, but with only partial success.

The foregoing is intended to be only a brief outline of the work that has been done on sound insulation and to suggest some of the things that are to be avoided. It is not felt that this article would be complete unless a brief reference were made to results of laboratory tests which have been published. Unfortunately, these figures do not give absolute results, such as can be obtained for heat insulation, but depend on the manner in which the measurements were taken and also to some extent on the rooms in which the measurements were taken. For this reason it is rather difficult to compare results made by different observers. If comparisons are to be made between different panels, it is rather desirable that all of the results to be compared should be made by the same observer. It is also desirable to call attention to the form in which the results should be published. Most of the laboratory measurements on sound transmission are made by using a telephone or microphone to pick up the sound energy which is to be measured. These instruments measure sound on what we shall call the "physical" scale. But the most universally used instrument for detecting sound and estimating its intensity is the ear, and unfortunately the ear scale is not the same as the physical scale. As the intensity of sound increases steadily on the physical scale, the response of the ear fails to keep pace with the increasing energy of the sound waves, but is in fact proportional to the logarithm of that intensity. For example, two sounds of intensity, 10 and 100, as measured on the physical scale, would seem to the ear to have the ratio of 1 to 2, the common logarithms of 10 and 100. And because of the almost universal use of the ear as a means of detecting sound, it is advisable to express the results of the experiment on the ear scale.

This method of expressing results presents some difficulties. While the relative sound transmission of two panels is always the same on the physical scale, no matter how loud the sound which seeks transmission, this is apparently not the case on the ear scale. A numerical example, given in this table, will illustrate this point. We consider two walls, A and B, of which A transmits 1/1000 and B 1/100 of the incident sound energy, measured on the physical scale:

Intensity of Sound on Far Side of Wall: Physical Scale	Wall	Intensity of Sound Transmitted: Physical Scale	Ear Scale
1,000,000	A	1,000	3 (=log. 1,000)
	B	10,000	4 (=log. 10,000)
10,000	A	10	1 (=log. 10)
	B	100	2 (=log. 100)

From this it may be seen that while A is 10 times as good as B (in the physical scale), no matter what the original intensity of the sound may be, the ear estimates A as twice as good as B for a faint sound, and both A and B as nearly the same (ratio 4/3) for a louder sound.

We should therefore be cautious about the use of such phrases as "twice as good a sound insulator"; the point that should be emphasized (in advertising or otherwise) is not whether one material is twice as good as another under some special condition but whether it gives sufficient sound insulation under conditions as are usually prevailing to reduce the sound to a point where it will not be annoying. This means that to make a satisfactory installation one should know approximately the intensity of the noise he is trying to insulate against and approximately how good a sound insulator is the type of structure that he proposes to build. It is hoped that these suggestions will be of benefit, and that they will aid in the building of better apartment houses.

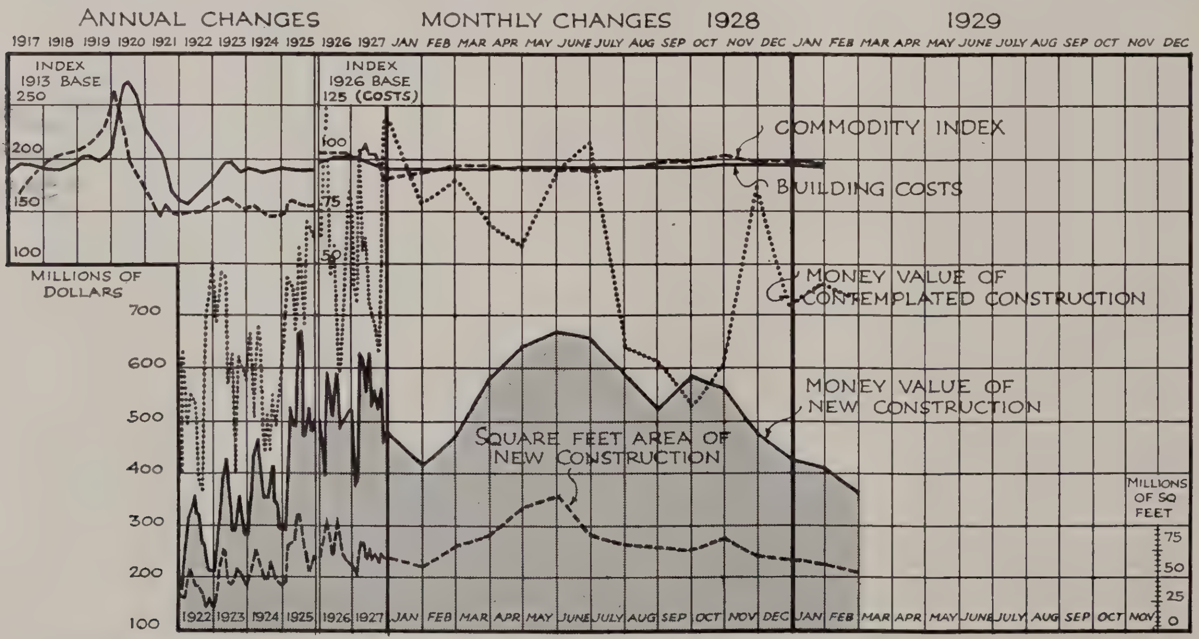
THE BUILDING SITUATION

A MONTHLY REVIEW OF COSTS AND CONDITIONS

FEBRUARY construction contracts awarded in the 37 states east of the Rocky Mountains show a 12 per cent decline from January of this year and a 22 per cent decline from February, 1928, according to figures provided by the F. W. Dodge Corporation. The total valuation of this February construction,—$361,273,900,—covers a period of four days less than the January totals, but there seems to have been approximately the same daily construction volume as that existing since the beginning of 1929. Combining the figures for January and February, 1929 gives a total of $771,241,800 and represents a decrease of 14 per cent from the 1928 construction for that period.

The district consisting of New York state and northern New Jersey, with a February total of $74,985,900, showed a falling off of 26 per cent from January of this year and 46 per cent from February, 1928. In the central west the total construction for February of $99,321,000, here again, was below the figure of the previous month by 12 per cent and below that of February, 1928 by 35 per cent. The only other district which showed a decrease for February, 1929 was that including the southeastern states, which had a total of $34,266,700, which is 12 per cent below the figures for February, 1928, and 9 per cent below the January, 1929 total. In the New England states construction was the highest ever recorded for this month. The total for the month of February was $26,430,700.

In the middle Atlantic states the value of construction started during February amounted to $50,689,700, an increase of 3 per cent over that of the preceding month and 9 per cent above the total for February, 1928. The Pittsburgh district showed an increase of 22 per cent over February, 1928, but its total of $50,298,500 was 12 per cent below the figures for January, 1929. This same condition existed in the northwestern states where the February contracts, $3,746,500, were 70 per cent higher than for February, 1928, but 40 per cent below the January, 1929 figure. The February contract total for the 37 states show that 36 per cent of all construction represented residential buildings, 19 per cent commercial buildings, 16 per cent public works and utilities, and 16 per cent industrial projects. Contemplated projects reported during February reached the total of $772,621,600 for the 37 states. This is 6 per cent less than the amount of contemplated work reported during January of this year and 18 per cent less than that reported for month of February, 1928.



THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Value of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Corp. and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the left of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the right of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined, first by the trend of building costs, and second, by the quality of construction.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

THE FIRST DAY ON THE JOB—*(Continued)*

Editor's Note. Mr. Beach here continues the consideration of "The First Day on the Job," Chapter 4 of which appeared in the February issue of THE ARCHITECTURAL FORUM.

Regarding saving by the waiving of a bond, the architect was known to be greatly in favor of so doing, as he regarded the unnecessary addition of 1½ per cent to the cost of a building to be quite unwarranted, except only as a pure matter of insurance. If it had been a private owner, the superintendent was quite sure that, with such a high class contractor, the architect would approve the saving, but, this being public work, the question was entirely one for the board to decide. It was obvious that the architect could not in any way be held for any of the contractor's defections, although the architect and superintendent would do their best to see that the contractor fulfilled the terms of his contract and met all his obligations pertaining thereto. It was thereupon decided that if a surety company could be found that would underwrite the architect's form of bond, such bond would be accepted; otherwise the board would consider doing without one. The agent was persuaded to send a night letter to his company, with the result that a bond in acceptable form was promptly forthcoming and all was well in that particular.

Returning to the site after lunch, the contractor was found directing his new foreman, starting work on temporary buildings, but it was apparent that neither had thought to consult the specifications on the subject:

"TEMPORARY OFFICE BUILDING. The Contractor shall, immediately after award of contract, provide a substantial, weatherproof building at the site, containing an office for the Superintendent, of at least 120 sq. ft. of floor area and fitted with movable sash on each open side, substantial door (with butts, latch and cylinder lock), table for blueprints, desk with drawers, locker, stool and two chairs, all as directed by the Superintendent and at the expense of the Contractor, who shall provide heat and light for same.

"CONTRACTOR'S OFFICE at the site shall be a substantial, weatherproof building, properly heated and lighted and appropriately furnished. It may be under same roof with Superintendent's office, with partition separating. The Contractor's office shall be the proper place of deposit for all copies of all drawings and specifications and for all his file records pertaining to the work. It shall also be the proper place for delivery of all orders and instructions to the Contractor. The Contractor or his Foreman shall be constantly in charge of same during working hours and shall maintain (on shelf accessible to the Superintendent) a telephone, served and listed by the local exchange, all at the Contractor's expense. Free use of the telephone shall be granted to Representatives of Contractors, Subcontractors, Owner and Architect, except that the Contractor may require reimbursement for tolls on long distance calls. He may also have a pay telephone installed for the use of others. The Contractor's office shall not be used for the storage of equipment or materials nor as a loafing place.

"MATERIAL SHEDS. The Contractor shall provide at least 3 shelter sheds where directed, separate or under one roof, each containing 260 sq. ft. (or more) of floor area, and of substantial weatherproof construction, with hinged door to each shed, and a window on each exposed side. Each door shall be fitted with hasp and staple and brass padlock with necessary keys. The Superintendent will assign space in these sheds according to his best judgment.

"TOILET CONVENIENCES for all persons employed on the work shall be constructed and maintained by the Contractor in accordance with City ordinance and State laws, properly lighted and heated and kept clean and sanitary, satisfactory to Superintendent and local Authorities."

Being set right on these subjects, the contractor and his foreman next proceeded to "stake out" the building in accordance with the plot plan, erecting substantial batterboards at each of the four corners. Fig. 7 illustrates the customary and proper manner of setting batterboards, which should be located far enough back of the edge of the excavation to be out of the way of teams and trucks. The boards are nailed to substantial stakes driven well into the ground and notches are cut in the upper edges as shown. "C" and "H" are on lines of outside surfaces of basement walls; "B" and "I" mark the inside surfaces; "A" and "D," and "G" and "J" are the outside lines of the footings; and "E" and "F" are the limiting lines of the excavation. Cords stretched from these notches to corresponding notches in boards at opposite corners afford lines from which a plumb-bob can be dropped and lines or points in the excavated portion be correctly located. Thus, plumbing down from intersection at point "L," the contractor locates the corner of his excavation at "K." If it is desired to prove the square of the corner at "L," one can use the simple rule of "the square of the hypotenuse is equal to the sum of the squares of the other two sides of a right-angled triangle," measuring 40

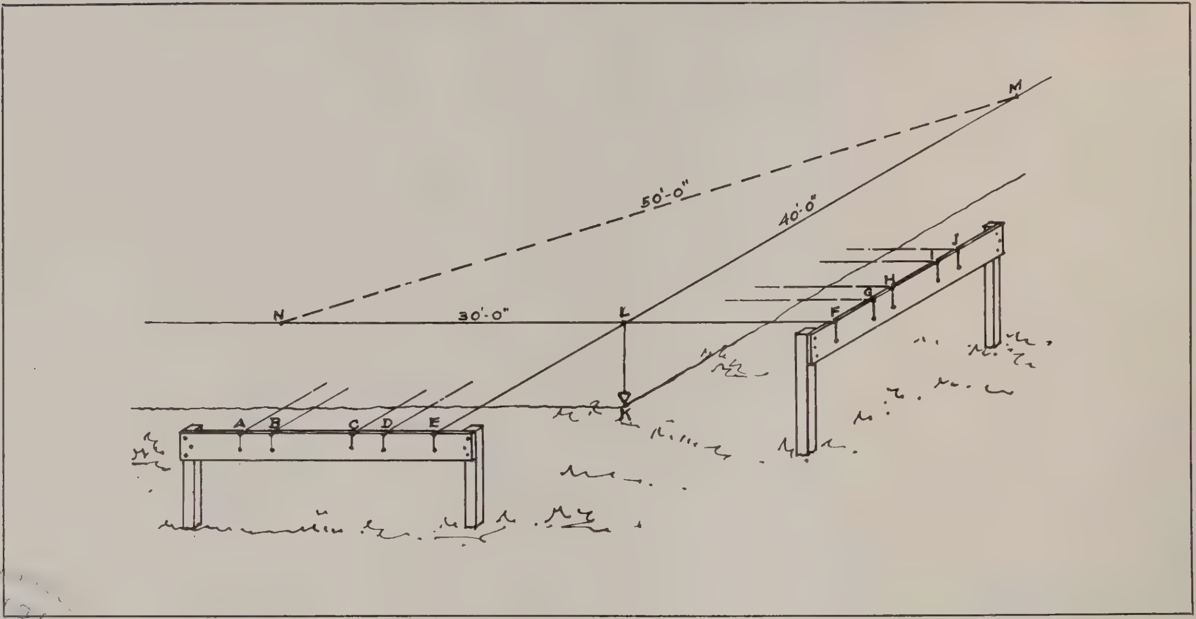


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Fig. 7. A Proper Arrangement for Setting Batterboards

feet in one direction from the corner, 30 feet in the other direction and 50 feet across the hypotenuse. This should be done with great care, as the variation should not be more than ½ inch in 100 feet.

Here is the superintendent's report of the first day's activities at the site:—

Work day:—No. 1.

Force worked:—10 hours.

Weather conditions:—Finest.

Temperature:—78° to 82°.

Number and kind of workmen employed:—

General Contractor:—6 carpenters and 1 foreman.

Excavating Contractor:—6 men with teams, 1 foreman, 1 steam shovel man.

Work today consisted of:—Taking out trees and shrubs; protecting trees and walks; starting stripping loam; bringing on steam shovel; starting to stake out the building and put up sheds.

Cause of delays, if any:—Contractor submitted bond on bond company's printed form which was rejected. He was notified he could continue work as trespasser until bond is settled. He is proceeding with that understanding. Board is to meet tonight to consider subject.

Drawings and information needed:—Contractor needs two complete sets of working drawings at once; one on cloth.

Daily letter:—Job started 2 days ahead of schedule without authority, but weather too fine to stop it. Contractor's liability insurance policy is No. 283,576 in .... Co. Grading subcontractor was ordered to get policy at once; promised for tomorrow. Job telephone, electric and water supply ordered in. Permit applied for; said to be a matter of form on public buildings.

To this, the superintendent added his room address for regular mail and the address of the job for receiving telegrams and special delivery letters.

CHAPTER 5

BEGINNING THE WORK

AFTER the first day's preliminaries at the site, the morning of the second day proved a busy time for the superintendent. First, he found that the subcontractor for grading had changed his mind about getting a liability insurance policy, —simply refused to do so, intimating that he considered the demand for it to be only attempted graft on the part of the member of the board of education who was agent for such insurance. He claimed further that the law did not require such insurance to be carried by employers who were financially responsible. To this the superintendent rejoined that it was not a question of law but of contract requirements, and that the policy must be forthcoming, quite regardless of who might be the agent. Here appeared the chairman of the building committee of the board, accompanied by the principal of the high school. This board member and the general contractor added the weight of their counsel to that of the superintendent, as a result of which the grading contractor finally agreed to secure a policy from another agent, and a copy of the application was handed the superintendent a little later in the day.

In discussing the work with the board member and high school principal, two matters of vital importance developed. One was that the school man had been delegated by the board to act as its representative on matters pertaining to the new building during intervals between board meetings; the other, that another board member, who was also a member of the town planning commission, had an idea that the building, located on a hillside with a fine prospect to the south, would look better and have a still finer view if raised about 3 feet higher than shown by the drawings. Decision on this was deferred, pending the next visit of the architect, due the following Monday, but the other matter was not one that could be either deferred or disposed of. The intervention of such an "agent" in building programs is not unusual and is a fruitful source of friction in too many instances. In the case of private work or that of a corporation, the agent is frequently looking more to his own interests than to those he represents, as a result of which the superintendent finds him presently aligned with one or more of the contractors to the detriment of the work. Even on public work, the agent, with no apparently dishonest intent, may be heard criticizing the architect and his documents as much as he does the performance of the various contractors. His relation to the work is only semi-official, with no definite limitations and, unless he is a very unusual individual, he is much more of a nuisance than a help. Having no real authority, it is nevertheless difficult for him to avoid assuming the semblance of it, especially if he be, as in this case, a school official accustomed to dictating to his subordinates. It is difficult to understand why, after employing an architect to conduct their operations, owners should consider it necessary to inject a personality whose very employment means merely an added problem to be dealt with. If a superintendent is compelled to face it, he had best "cultivate" the incumbent and trust that he will not prove a deliberate trouble maker.

This man had started being officious the preceding day, before the arrival of the superintendent, by directing the grader to have the slip-scrapers dump the top soil into a small ravine that required filling. This error was corrected, and the loam was ordered piled on high ground where it would be subject to minimum wash from storm water, as provided in the specifications:

"TOP SOIL. At beginning of excavating, the black earth at surface shall be removed to a depth of 9″ to 12″ over the building site and piled on premises where directed by the Superintendent, to be distributed as required before completion of the work."

Neither the school man nor the grader had thought to consult the specifications on such a minor matter, but the incident was of value as initial proof that there should be but one head to the work.

The superintendent and the principal also reviewed other specification paragraphs especially applicable at the beginning of the work:

"PERMITS for building construction, street obstruction and water connection shall be taken out by the Contractor before operations are started. He shall pay all fees for same, including inspection fees and cost of all water used for the work of others, as well as for his own operations."

"PROGRESS PHOTOGRAPHS shall be taken by a professional photographer at the expense of the Contractor at intervals designated by the Architect, 12 negatives in all, on 8″ x 10″ plates. Three prints from each negative, mounted on linen with binding margins, together with the negative, shall be delivered promptly to the Superintendent by the Contractor, in each case."

"LINES AND LEVELS. The Owner will have lot lines and restrictions established and a copy of survey provided on which same are indicated, also stakes and marks evidencing same, together with a permanent bench mark conveniently located. The responsibility for all other lines and levels necessary for proper location and erection of the building and appurtenances rests with the Contractor who shall employ a competent instrument man."

"USE OF PREMISES. (From Art. 42 of A. I. A. General Conditions.) The Contractor shall confine his apparatus, the storage of his materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the Architect and shall not unreasonably encumber the premises with his materials."

"PROPERTY CONFINES. The Contractor shall limit the storage of his materials and the operations of his employes as prescribed in Art. 42 of the General Conditions and shall not infringe upon storage and operating space assigned to others. The Contractor has no authority to permit the use of any portion of the premises by anyone, except for business connected with the construction in which this contract is concerned."

"EXCAVATING IN GENERAL. The Contractor shall provide all excavating for basement, areas, etc., all to the various depths required. Hand excavating for pits and footing trenches is included with foundation work. Excavations shall extend 2′ 0″ outside of all basement wall planes and to 9″ below finished planes of various basement floor levels. Work shall start at one end of the building, as directed by the Superintendent, and shall proceed uniformly to the opposite end, completing as it progresses, so that the first end can be turned over to concrete workers without waiting for entire excavating to be completed. The work shall be so laid out and conducted as to produce no conflict between concrete workers, trench diggers and those working on remaining excavating."

Taking stock of these matters in the order quoted, the superintendent learned that application had been made for a building permit and that a set of prints had been filed with the local building department, that the issuance of a permit in due time was to be expected as a matter of course, but that nothing had been done about water supply or the first progress photograph. He insisted that the contractor give these subjects immediate attention and that he also arrange at once for the requisite telephone service.

The foreman and an assistant were continuing the work of staking out the building, the former making use of a surveying instrument. The contractor satisfied the superintendent that he, the foreman, could qualify as the "competent instrument man" demanded by the specifications. The superintendent later verified this, as well as the accuracy of the instrument and the work done by it.

Meanwhile, a carload of cement had arrived on the tracks, and the contractor was anxious to unload it, to avoid paying demurrage. He asked permission to have it stacked on the shed floor and have it covered with tarpaulins. Reference was made to the specifications, wherein clauses were found pertinent:

"ALL CEMENT, except where otherwise specifically stated, shall be approved Portland, properly tested before using. It shall conform in all particulars to the latest standards and tests of the American Society for Testing Materials. Samples shall be taken as directed. Each car lot shall be stored separately and plainly marked for identification.

"Cement shall be stored in the water- and weather-proof shed, provided by the Contractor (as elsewhere specified), with floor well up from the ground. None may be used that has been exposed to weather nor from bags showing water marks or caking."

The contractor, in view of these restrictions, was directed to leave the cement on the tracks while the shed was rushed to completion. Four samples were taken from the car lot and sent to the architect's office for testing, the brand being one known to be acceptable to him. The manufacture of Portland cement has reached such a degree of standardization and excellence that metropolitan architects and contractors seldom have cause to reject more than an occasional sack that has met with accident. Cement for use in cities is always subject to testing, and hence it is safest and most economical for the manufacturers of this commodity to ship none that might fail to meet requirements. This is not so in rural districts, where most of the cement sold (other than that shipped in car lots for road work or large buildings) is first stored in lumber yards, then distributed in small parcels to local builders who have no desire to test and no convenient facilities for so doing. Such cement should be carefully watched, as it is not unusual for it to fail under test. It may have been originally bought at a bargain because of its inferiority. There is always a chance that a country dealer will try to unload some of it on such work as this school, in a real or pretended emergency, hence the wide awake superintendent will keep an eye on it and should warn both the dealer and contractor that no such old or stored cement is to be used under any circumstances; and it would therefore be expedient for the dealer to make sure that he has enough of the right material on hand at all times.

The location of sheds and the dumping of top soil led to a general discussion of the contractor's yard layout. Together, he and the superintendent evolved a working plan for all temporary storage and facilities, as shown by the plot plan, Fig. 8. The superintendent's interest in this phase of the work has to do only with seeing that provision is made for storage space for minor contractors' materials, and that temporary buildings and heavy materials are not so placed as to be in the way of trenching for sewer and other piping. In this case, the available space was ample for all purposes, but in a more confined location, considerable ingenuity must be exercised in designing a temporary layout of maximum efficiency and in avoiding friction between all contractors demanding accommodation. It will be noted that this contractor arranged to have his sand and gravel dumped on the paving, to avoid the expense of building a floor, as would have been his alternative under the specifications. Materials to be first used from storage piles, such as floor tile and common brick, were piled as close in as possible. Floor tile (for first floor only) would be all used before the hoist would be placed in service. Thereafter, brick and wall tile, in limited quantities, could be unloaded close to the hoist.

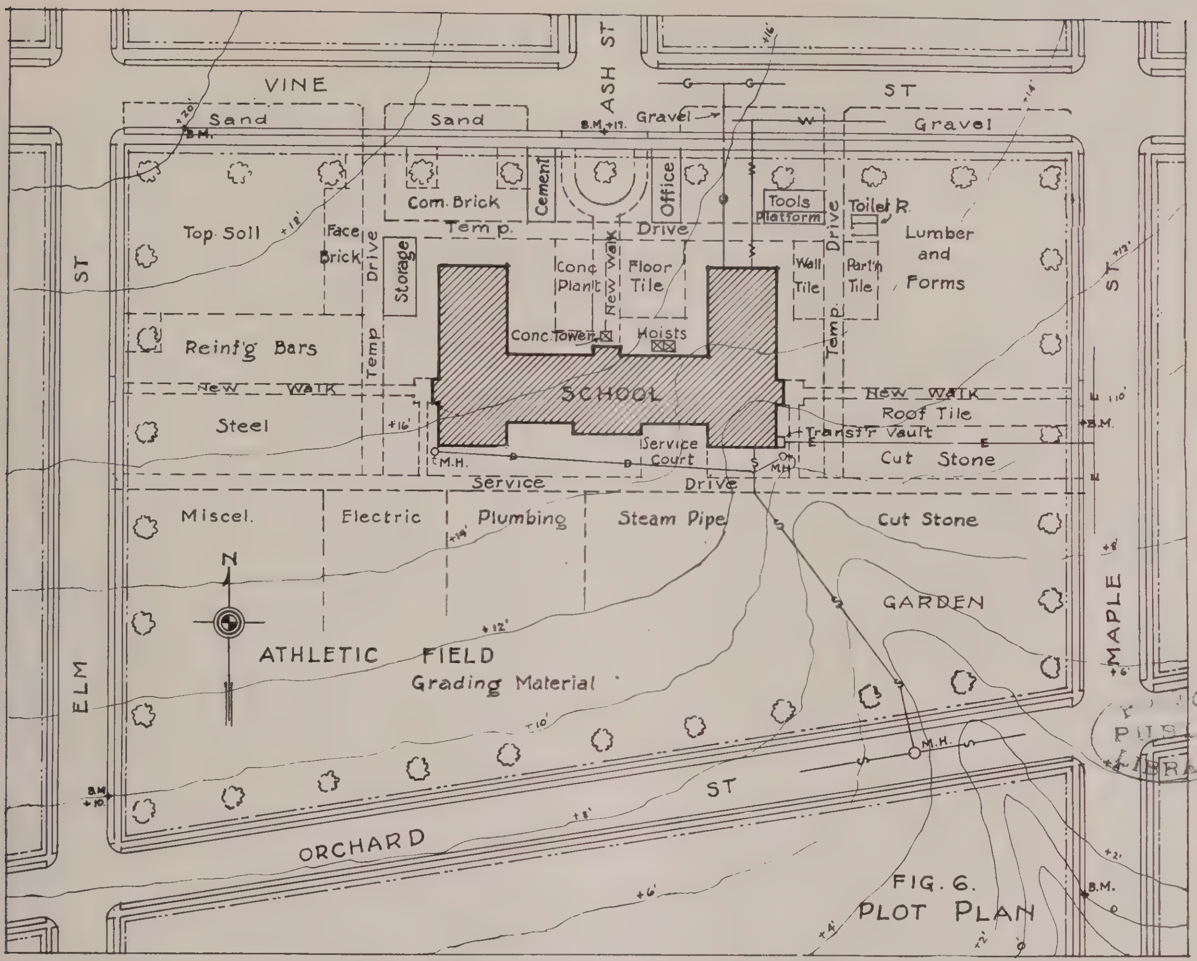

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Fig. 8. Plot Plan Showing Disposition of Building Materials on the Site

Larger areas were allotted to items requiring sorting and re-handling, such as lumber, cut stone and reinforcing bars. Temporary drives were combined with the future service driveway to afford maximum communication at minimum distance, inasmuch as these roadways had to be maintained for several months and might be very muddy at times. For this latter reason, the contractor was given permission to start hauling cinders for use as temporary paving for these drives with the understanding that such cinders as were still in fit condition could later be used as underbed for walks and permanent driveway.

In the afternoon of this second day, the contractor suggested a trip to the gravel pit from which he expected to secure both sand and gravel, using the latter "pit-run." In fact, he admitted having gambled on such intent and had reduced his bid several hundred dollars on the chance. Before leaving the premises, the superintendent wrote an order to the contractor to hold his excavating 3 feet higher than shown on drawings, pending arrival of the architect and his decision on the proposed change in the building grade. The necessary instructions on this subject were passed on to the grading contractor who was also informed as to the proper amount of material to be left on the premises for finished grading. Enough stripping of top soil had been done for the steam shovel to get into action, hence it and the auto trucks were already working to capacity.

En route to the gravel pit, the superintendent consulted his specifications and re-read the paragraphs on the subject of aggregates:

"SAND. Fine aggregate shall consist of sand having hard, durable grains, free from injurious amounts of dust, lumps, soft or flaky particles, shale, alkali, organic matter, loam or other deleterious substances. It shall be well graded in size up to ¼"."

"COARSE AGGREGATE shall consist of crushed rock or gravel having clean, hard, strong, durable particles, free from injurious amounts of soft, friable, thin, elongated or laminated pieces, alkali, organic or other deleterious matter. It shall be well graded from ¼" to ¾" for fine concrete and from ¼" to 2" for mass concrete. If gravel is used, it shall be screened to size and washed if, in the opinion of the Architect, such treatment is indicated." "Occasional pieces larger than 2″ will be permitted in mass concrete, provided that same are entirely embedded in wet concrete and have no surface closer than 6″ to outside plane of the mass."

"STORAGE. Sand, stone and gravel shall be deposited only on paving or suitable planking; never on bare ground."

The pit was found to be one long disused and recently re-opened, evidently for this particular work. The stripping had disclosed a good bed of gravel lying between the surface stratum and one of fine sand. Both stand and gravel appeared to be of good quality. The chief difficulty was evidently going to be the task of keeping the fine and coarser aggregates separate and at the same time free from droppings and wash from the overlying earth. This latter, the contractor proposed to effect by using hand excavating for the gravel and following with a steam shovel and a portable sifting plant that would deliver sand of proper fineness. The stripping was to be kept well back from the pit, and proper watersheds maintained to fend off storm water. The superintendent appreciated the contractor's effort to hold down costs and expressed himself as being quite willing to coöperate wherever possible, keeping always within the intent of the contract. If pit-run gravel of suitable character could be delivered at the building site at a cost of about $1.75 a yard, and the sorted material at an additional 50 cents, the contractor would be sufficiently under the local price of $4 a yard for crushed rock to have justified his gamble. The gravel would probably contain too high a percentage of sand, the which could be equalized, as he explained, by the admixture of the indicated amount of coarser material.

It is evident that the superintendent was going out of his way to help the contractor and equally evident that he was running the risk of making later trouble for himself by the necessity of closely watching the ratios of sand and gravel. It would have been much easier and safer for him to have pointed out the advisability of having a washing and grading plant installed before beginning to haul material from the pit, but this would have raised the cost of coarse aggregate to about that of the crushed rock. It is likely that the more cautious course would have been that adopted by the majority of superintendents of experience, but this man was imbued with the idea that, if he would go somewhat out of his way in the matter of coöperating with the contractor at this stage of the work, he would find himself repaid later on; so he tacitly approved the contractor's arrangements and took samples of the sand and gravel and expressed them to the home office.

The two then drove to a brickyard to inspect common brick and partition tile for which contract had been made, subject to approval. They found three grades of each, separately piled,—"kiln-runs," "selects" and "culls." Another grade, termed "standards," was not shown. In this grade, only the very poorest and softest had been culled out. The superintendent was told that the material used by local contractors was generally "kiln-run," but that it was then being culled to comply with his strict specifications. The superintendent gave provisional approval of the selects but cautioned the contractor that such approval was made conditional by this paragraph of the specifications:

"'APPROVAL' AND 'ACCEPTANCE' in these specifications, unless otherwise stated, mean approval and acceptance by the Architect; but no acceptance by the Architect shall bind the Owner in case of proven defective work or other clear violation of the contract; nor will approval of material or equipment before same is brought on the premises be held to constitute acceptance, in case such items are found not to comply with specification."

Three samples showing the range of select common brick were also sent to the express office. The next stop was at the lumber yard, merely, as the contractor explained, "to get acquainted." The fact that the lumber dealer was also a member of the board of education appeared to embarrass him not at all as a purveyor of materials to the school building. Both he and the contractor showed considerable surprise, however, when the superintendent expressed a desire to see the stock of No. 1 white pine lath. They thought he was looking a long way ahead. This was admitted, and the stock of various grades of lath inspected. The best grade showed signs of having been on hand a long time, which was explained by there being but little call for it, contractors generally saving the few dollars per thousand difference in price by ordering the cheaper grades (perhaps claiming that the No. 1 grade was not to be had). The superintendent suggested that such extremity be avoided on the school work by ordering well in advance, which the contractor agreed to do, receiving a further hint to the effect that this architect considered metal lath to be the only adequate substitute for No. 1 white pine.

Inspection of wood lath is always a matter for the close scrutiny of the superintendent, when they are called for. No. 1 white pine lath are generally specified by architects where wood lath are indicated, because of the impression that no other wood can back a good plaster surface quite so well. Obviously, this grade is only carried in yards where the demand warrants buying full car lots, or where possible, part loads of "mixed" cars. Contractors and supply dealers will seemingly exert themselves more to substitute something else for these lath than to effect any other evasion of a given contract. Usually the lath is not delivered until the lathers are on hand to apply it, and the inspector must then either compromise or delay the work. Hence our introduction of the subject thus early in the procedure.

Many instances could be cited to indicate how far contractors and dealers will go in their endeavors to evade the exactions of a No. 1 white pine lath specification. In one such case, a young clerk-of-the-works was induced to pass a carload of other lath because the No. 1 white pine "was not to be had in that market." But that market happened to be in the Black Hills, where such lath are a local product, hence the members of the building committee were up in arms when they saw the lath from outside being unloaded, and wired the architect to set the matter right. This he did by dismissing the superintendent and taking advantage of the specification clause which permitted the owner to refuse "accepted" material that was manifestly not up to requirements.

Another instance was that of a bank building being constructed under a "cost-plus" contract. The builder had purchased his lath as part of his lumber bill from a dealer who happened to be a director in the bank. Three months later, when ready for the lath (this was in 1920, when prices were advancing by leaps and bounds), the builder was informed that he would have to use a cheaper grade, as the No. 1 were not to be had for less than $18 per M. To this the builder demurred as he had bought them for $8.50 per M. But the dealer naïvely contended that he could not be expected to store them indefinitely at the price quoted. So the builder offered to pay storage, but found that the dealer had sold the lath to others at a fat second profit. Later, in the absence of the builder, the dealer told the other directors about the dilemma, omitting to mention that the lath had really been ordered and sold at the lower price. He insisted that he would not cut his prices to favor an "outsider" but, to accommodate his bank, would deliver the lath for $15 per M., if the order were signed then and there, ahead of another threatened rise, which was done. The dealer said nothing further of the matter until the time of final reckoning, when it amused him to divulge the particulars of the deal.

It developed on the school project with which we are dealing that our forehanded superintendent "started something." An immense amount of gossip anent an outstanding construction operation in a small place circulates continually during its progress. It is malicious, disinterested or merely critical,—according to the animus or interest of the vender,—but seldom helpful. Here we may record an accidental exception. The architect had specified tile partitions in the basement and tile or gypsum block (at contractor's option) above the basement, except for certain minor partitions, for which metal-lath-and-plaster, 2 inches thick, was called for. The architect's instructions from the board were to produce a building of the requisite size and appointments, as nearly fireproof as the appropriation would permit. But, as is not unusual, it developed that the requirements far outran the limits of the appropriation; hence, in order to reconcile the two, he had asked the bidders for three major alternatives:

1. The saving to be affected by substituting light-weight steel beams or trussed-metal joists for flat-tile-arch-and-concrete-joist floor construction.
2. The saving to be made by substituting wood rafters and sheathing on steel framing for the concrete roof construction.
3. The having to be made by substituting wood lath and studding for tile-and-metal-lath partitions throughout the building above basement.

The contract had been awarded on the basis of all three savings, except that trussed-metal-joist construction was adopted only for the second and third floors, and not for the first. However, so much criticism was suddenly aroused because of the idea that a building originally intended to be approximately fireproof was falling too far short of the intent if stud partitions were used, that the board members hastily decided to reconsider the third alternative. Hence this subject, and also the question of raising the grade at the building, were made causes of the calling of a special meeting of the board on the afternoon of the day of the architect's visit.

The first work day under the schedule found the job well organized. Trees and walks had been duly protected; scrapers were busily piling the top soil; the steam shovel and its covey of motor-driven dump carts were in systematic action; carpenters were completing the cement shed and starting the office building; and the photographer was on hand to take the first photograph. Inasmuch as 12 of these were included in the contract, it was assumed that only one exposure per month was expected, and therefore the viewpoint was carefully chosen by the superintendent to afford maximum information regarding the activities in progress at each period. The superintendent also intended to make use, from time to time, of his own small camera for such snapshots as would serve to record particular conditions and illustrate the points discussed in his daily reports.

The end of the first week recorded five and one half work days of excellent progress. Stripping of top soil had been completed, and the excavating was well under way. A concrete plant was being installed at the upper end of the site, and the carload of cement had been stacked in the nearby shed, which was being covered with 1-ply, hard-surfaced roofing felt. The office building was being similarly completed, and a shed was being erected for the shelter of workmen and their tools; a fourth shed had been decided upon by the contractor, for the use of subcontractors, in preference to permitting them to share the space in his tool shed. Another crew of carpenters was constructing forms of a standard size for use in building the basement walls. Two crews of linemen were running wires for telephone and electric supply. The water main had been tapped, and a ¾-inch supply was being run on top of the ground to a point near the concrete plant. Several loads of pit-run gravel had been dumped on the paving above the concrete plant, and the delivery of this material was going forward rapidly, but no sand or graded coarse aggregate had come from the pit. A carload of reinforcing bars had been unloaded in the space assigned for their sorting and storage.

Saturday, weather being fair, the excavating machine and dump trucks continued in operation throughout the afternoon, the other trades "knocking off" at noon. When the shovel reached the level where the contractor had been told to stop, 3 feet above that orginially intended, the shovel man advanced the claim that he would lose money if his machine could not work continuously. This the superintendent admitted, but pointed out that he was merely working overtime to his own advantage, and that the status of the work at Saturday noon was supposed to be identical with that at the beginning of work on Monday morning, when the architect would be on hand to render a decision. The shovel man thereupon continued as directed without further argument, admitting that the remaining three hours would not make much difference.

Before leaving the site that night, the superintendent saw to it that a small diverting trench for storm water was dug in the sod above the excavation. He also inspected the cement shed and found that the carpenters had left without completing the waterproof covering. In spite of the fine weather, he insisted that the covering be completed. This was attended to personally by the general foreman and carpenter foreman. It was well that they did, for a severe storm of rain and wind occurred on Sunday and continued throughout the night and until Monday noon. On Sunday afternoon the architect was advised by telephone to defer his visit until Tuesday, which he did. Meanwhile, stock was taken of the damage done at the site. Fortunately, it was not serious. The cement shed proved tight, but the diverting ditch had been insufficient for the purpose, and the excavation was a sad mudhole. A controversy arose between the general foreman (his employer being absent) and the excavating contractor as to who should provide a power pump. The excavator claimed he had figured only on excavating,—was not in the pumping business. The foreman contended that the subcontract had been awarded for the excavating as specified, to which the other rejoined that he had bid "on the plans" and hadn't seen the specifications.

Both parties had already learned to respect the judgment of the superintendent, but he insisted that it "wasn't his funeral" and referred them to the specification clause directly applicable:

"SPECIFICATION DIVISIONS. For convenience of reference, this specification is divided into various headings and subheadings, but such divisions do not make the Owner or Architect responsible for the limitations of the contract of any subcontractor, each of which contracts shall be dependent upon its own definite confines, regardless of specification divisions."

Many metropolitan architects omit this clause from their specifications and insist that their divisions *do* govern the limitations of a contractor's understandings with his "subs," but it is a custom full of inconsistencies and fraught with much danger. In this case, it would have made an issue out of a matter which was merely a cause of argument. To settle it, the superintendent cited the two paragraphs in the specifications applicable. Under "Supplementary General Conditions," he found:

"STORM WATER and water from springs and pipe leaks shall not be allowed to stand in the excavations or basement or other parts of the building, but shall be adequately guarded against by ditching, draining, pumping or other approved means."

And, under "Excavating":

"PUMPING. All parts of the excavations shall be kept free from standing water from any source (as specified under Supplementary General Conditions), for which purpose the Contractor shall provide hand or power pumps of needed capacity until drainage connection to sewer is made available."

(*To be continued in the May, 1929 issue of* The Architectural Forum.)

7.2.

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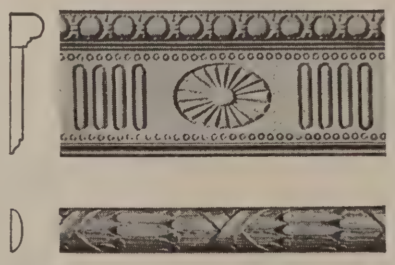

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SIR BANNISTER FLETCHER'S history of architecture, a volume of more than 900 pages, is still beyond doubt the most thorough-going and concise general history published on the subject. The present edition,—the seventh,—with about 3500 illustrations, is solid, complete and full of readily accessible information on all historical phases of man's attempts to build beautifully,—without including the modern, and this particularly as a type which has assumed importance in America in the last few years. In this the book is hopelessly inadequate. Perhaps it may have been intentional on the part of the publishers to reserve treatment of this type of architecture for another ten years, so rapidly are changes occurring in architectural taste today. At any rate, it would be understandable and perhaps very wise,—in a sense,—on their part to delay consideration.

Any book reviewed or advertised in THE ARCHITECTURAL FORUM will be supplied to subscribers at the published price. A remittance at the advertised price must accompany each order. Books so ordered are not returnable.

The author calls his work " a history on the comparative method." With an actual, continuous, day-by-day study of architecture, this is about the only method by which one may get beneath the surface. Almost anything else is likely to be sketchy or "literary" and for classroom use only,—next to impossible as a text. This truth has came home to the present reviewer in the more or less intimate contact with the history of architecture which he has gained in six years by actually teaching it. The first advantage of the comparative method is that it ties the subject in with all the other forces of civilization, thereby giving architecture its far-reaching significance, which otherwise cannot be comprehended. Especially it should be noted that under this comparative method the analysis of structural characteristics of the historic styles becomes clear and thereby extremely valuable, even to those of the building profession who are not concerned with problems of design. A slight objection might be made to the volume on the basis of the author's approach to what might be known as "pure," or "creative," design. In practice today it is being found increasingly true that to do original work, the architect should have conceptions which are sound independently of tradition; that even through the medium of traditional styles he must first have some conception which depends on nothing more than "pure form." That, the reviewer believes, is what is usually meant when we speak of "sound design" or "good, clean design." The facts in this volume stress about everything except this.

But after all, perhaps such considerations are rather personal, depending on the designer himself or the influences he experiences which only the personality of his university contacts or those of the profession may shape. And then too, this particular history of architecture does what it sets out to do in a very complete manner and does not purport to go into the subject of systems of design. One other slight objection, which might be made, concerns Sir Bannister's material on the architecture of the New World. His actual published material in this sphere includes six pages (776-782) on "Architecture in the United States of America,"—than which term we think nothing could be more general and less selective, and even this scant space is not on what we like to think of today as "an American architecture," in any sense. These six pages end rather abruptly with brief considerations on the "Sullivanesque" and the wonders of the Woolworth Building. On the pre-Civil War architecture of the South he contents himself with a brief flourish of verse:

> "Built in the old Colonial day,
> When men lived in a grander way."

And he refers to the South as ". . . an old social system . . . swept away in the Civil War by the energetic sons of the North." We earnestly hope Sir Bannister Fletcher's grasp of architecture in America is not representative of the view of contemporary British architects. We think it unlikely, even if we could count only on the dissemination of stimulating knowledge by the architectural journals which come to us in the United States.

To carry this criticism of the treatment of architecture in the New World further, there might be some objection raised to the segregation of what he refers to in the book as the "Non-historical Styles." These include what are really perfectly logical developments, only happening to be practically unstudied and little known,—as Indian, Buddhist, Chinese and Saracenic architecture. Perhaps it has not been generally realized by the profession that the subject of the ancient architecture of Indo-China, for example, is alone a subject for two or three volumes! To look further southward on this same continent, we note that there is not a morsel of information in the book concerning the four centuries of that glorious and indigenous development in vice-regal Spanish Mexico, nor the even more intensely interesting developments, more or less contemporaneous with late Roman and early Christian,— the Mayan structures of

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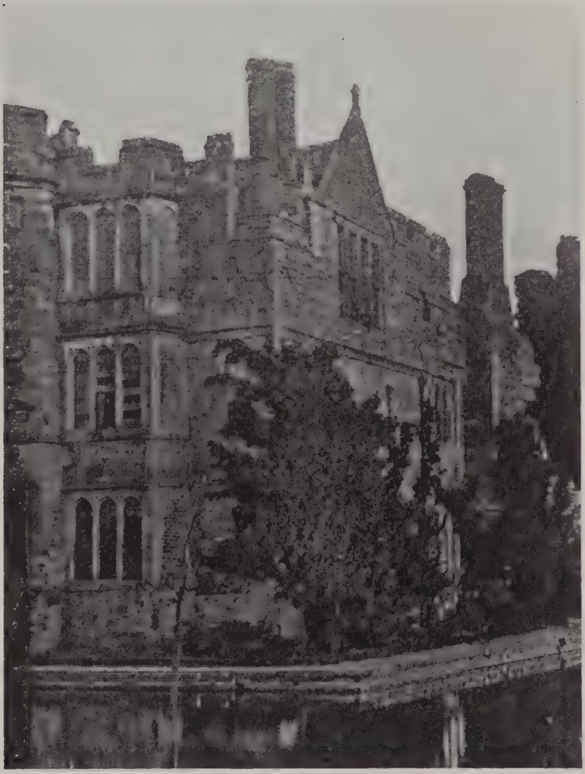

HEVER CASTLE, KENT.

¶ "Garner and Stratton" invariably comes into use when an architect is working in the Tudor, Elizabethan or Jacobean style. Its brilliant illustrations of old buildings may be depended upon to afford precedent for modern work and to supply inspiration for adapting these marvelous styles to present-day use. The difficulty of securing the two volumes, their unusual size, and the fact that they have dealt chiefly with elaborate work have hitherto prevented their wider use.

¶ A new, enlarged and improved edition of this important work overcomes these objections. The page size of the volumes has been considerably reduced, their contents much enlarged, and the additions to the subject matter deal largely with work of the simpler, more moderate character which is adaptable to use in America today. The two volumes abound in illustrations of exteriors and interiors of domestic buildings, and these illustrations are supplemented by countless drawings of details,—half-timber work; chimneys; wall paneling; doors; door and window surrounds; mantels and chimneypieces; ceilings; stairways; interior vestibules, and the other details which mean so much to the designer and aid so powerfully in creating the atmosphere belonging to these English styles.

2 *volumes;* 237 *pp. and* 210 *plates;* 12 *x* 15 *ins.*

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521 FIFTH AVENUE, NEW YORK

Yucatan and other parts of Central America. This, in view of the comparatively extensive information available today, most of which has been made available by Maudsley, Joyce and others who are also Britons and contemporaries of Sir Bannister Fletcher, is perhaps the gravest and least excusable of the omissions from his volume. There is a growing and deeply justifiable interest in these things in America, and in America we have eminent authorities on the Mayan and Spanish-Colonial civilizations who might have collaborated ably.

But, however these things may be, on the whole, for a thorough-going study of architecture,—as a continuous interwoven development of the "historic" styles,—the student of architecture, whether youthful collegian, thoughtful man of the profession, or even the more or less casually interested layman, will probably be able to find no better volume than this of Fletcher's. Even for the layman the book should be profoundly interesting as a carefully annotated record of the most monumental product of civilization,—great architecture. It is in this sense that it is increasingly regarded as a classic.

A HISTORY OF ARCHITECTURE ON THE COMPARATIVE METHOD. By Sir Bannister Fletcher—F.R.I.B.A., F.S.I., F.R.G.S. Price $8.50. Charles Scribner's Sons, New York.

ENGLISH AND AMERICAN FURNITURE. By Herbert Cescinsky and George Leland Hunter. 312 pp. 6⅛ x 9 ins. Price $7.50. Dean-Hicks Company, Grand Rapids, Mich.

THERE is no parallel between English and American furniture until well toward the close of the seventeenth century. For obvious reasons, the Gothic and Tudor types exerted little or no influence in the New World. From 1640 until 1700 English pieces were to some extent copied by the American colonists, but because of lack of facilities and geographical isolation the American models were anywhere from 20 to 50 years behind current fashions in England. Due allowance must be made for this fact in fixing their dates. The American pieces of this period are distinguished from their English prototypes by a certain crudity, more in lines and proportions, perhaps, than in actual workmanship. Many of the finer pieces ascribed to New England during this era were undoubtedly imported from England, as has since been agreed. One must bear in mind that it was not the craftsman but the "general utility" man,—the carpenter and joiner,—who was most active in the American settlements; it is from this class that the early settlers came, and the work of their hands is evident in the furniture of that period. Cabinet making, chair making and wood carving were separate trades in Great Britain at that time, and the finer craftsmen were not attracted so far from home.

But toward the middle of the eighteenth century there occurred a definite traceable exodus of craftsmen from England to the New World, especially toward Pennsylvania and Massachusetts. These men brought with them their design books, their sketches and their plates, and at once there began to appear a finer type of furniture, especially around Philadelphia and Boston. By that time America had established a definite furniture style of her own, more adapted to New World needs, and political differences with the mother country, which culminated in the Revolution, had their effect even on furniture. No longer did America blindly copy the models from across the sea. American adaptations of these designs were quite different from their English prototypes. This does not mean they were less artistic or well made,—merely that they were different. Every trade has its traditions and methods, and those which arose in Pennsylvania and New England during the latter half of the eighteenth century were not the traditions and methods of the English cabinet maker and chair maker. Philadelphia Chippendale is quite different from any English work. To the connoisseur the resemblance is more imaginary than real. Incidentally, it is interesting that the most ornate furniture of this period was made for the people of the Quaker City, to whom ostentation and luxury were supposedly forbidden!

The student who wishes to distinguish easily between the furniture of the mother country and that of her offspring will find much useful information in the work "English and American Furniture" by Herbert Cescinsky and the late George Leland Hunter. It is described in the introduction as a "pictorial handbook for ready reference for busy men," eager to assimilate in as short a time as possible the essential points of difference and resemblance between the furniture of the two countries. To make this the more clear and practical, the furniture of the two nations is described not separately but in successive pages with illustrations of pieces of both origins shown side by side. The text is by Mr. Cescinsky, the illustrations are from photographs supplied by Mr. Hunter. The work was originally designed to be of much wider scope, but the untimely death of Mr. Hunter during the compilation left his collaborator much hampered. He could only assemble as best he could Mr. Hunter's photographs and scattered notes, cognizant of the fact that much information which would have made the book more valuable died with its co-author. It deals pictorially with the furniture made in Great Britain and the American colonies, some in the sixteenth century but principally in the seventeenth, eighteenth and early nineteenth centuries.

The wood used in the various furniture pieces, which unfortunately does not show in the volume's illustrations, may be taken as the most definite criterion of origin, the author explains. While walnut was fashionable for furniture in England from 1660 until 1700, there was no walnut period in America. In the colonies oak was used until it was replaced by mahogany. In rare instances walnut chairs are found, particularly in Delaware, but elm, ash, hickory and pine are more common. For furniture of the settler or cottage type, deal and pine were generally used, and one frequently finds pieces where many woods are used together. Veneering is rare, and where found the base is usually soft pine (after the Dutch manner) instead of English oak.

"The furniture of both England and America has centuries of tradition behind it," Mr. Cescinsky explains. "If we take any piece, however original or novel it appears to be, it will be found it has sprung from a long ancestral line. In the majority of instances there is a continual change, an evolution, but the 'bridge pieces' exist if we search for them patiently. . . . At no period did a population awake one morning to hail the advent of a new manner. From Gothic right up to Sheraton and Duncan Phyfe there is this developmental line. Occasionally some new and drastic circumstance may impose a new, rigid channel into which evolution is forced, in the same way as the zoning laws of New York com-

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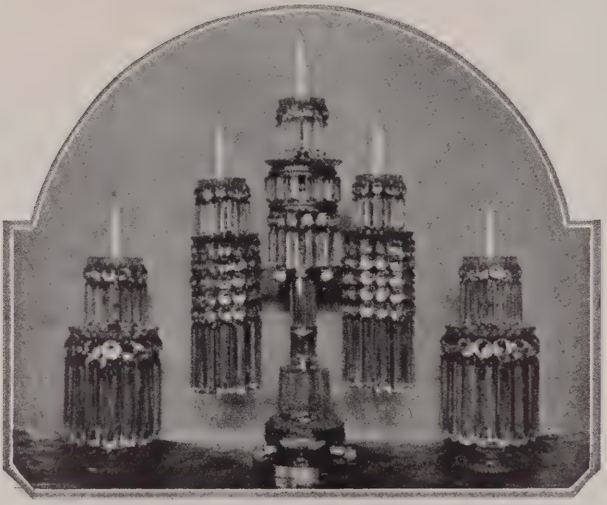

By far the most complete and authoritative work on this important subject, it is a study of lighting fitments of all the historic styles of architecture and decoration. Carefully written by Mr. and Mrs. G. Glen Gould and lavishly illustrated, the volume is a dependable guide in the designing of fixtures for the most severely simple or the most elaborate interior.

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pelled architects to design tall buildings in such a manner that after a certain number of stories they were obliged to step back and produce a series of receding planes. In other words, a new era in building design appeared to supervene where masses were conceived vertically instead of as a series of horizontals. Yet the pyramids of ancient Egypt were built in much the same manner. There is nothing new under the sun." The book is profusely illustrated with plates from photographs, and it contains a complete and helpful glossary.

THE ROMANESQUE ARCHITECTURE OF WESTERN EUROPE; ITALY, FRANCE, SPAIN, GERMANY AND ENGLAND. By Ralph Warner Hammett; Preface by George H. Edgell. 145 half-tone plates, 9x12½ ins. Price $12.50 Net. The Architectural Book Publishing Co., New York.

THIS volume contains plates, many of them consisting of two or even of four separate illustrations, so that the number of subjects presented is considerably in excess of the plate numbering. There is a short preface by Professor Edgell, of Harvard, and the author's text is divided into brief sections occurring at intervals among the illustrations and arranged according to the geographical divisions of the book. Mr. Hammett held the Nelson Robinson, Jr., Traveling Fellowship from Harvard, and the volume embodies some of the results of his studies abroad. As Professor Edgell says in his preface, after calling attention to the belated popular recognition of Romanesque claims, "nowadays . . . even the public is beginning to understand the independent position and self-sufficient beauty of the Romanesque style. It has been classified and re-classified, divided and re-divided into its organic and inorganic parts. Its geographic differences have been pointed out, but at last it has come into its own as a style worth while in itself, with its own lessons and its own beauties, whether it be organic or inorganic, or in whatever part of Europe it may appear. It thus takes its place as an art which will give deep pleasure to the layman and inspiration to the architect." With the undoubtedly growing appreciation of Romanesque architecture, Mr. Hammett's book comes as a welcome addition to the illustrative material already available in readily accessible form.

In the introductory matter the author gives a brief resume of the historical background and the social phenomena attending the genesis and growth of the style. Although this rehearsal barely touches upon the more significant forces at work, and enters into no detailed discussion whatever, it at least bears witness to the author's conviction that intelligent understanding of any mode of architectural expression presupposes and demands some knowledge of the historical conditions out of which it sprang,—a conviction which it is greatly to be wished more architects might have forcibly borne in upon them and act upon. A summary of "general characteristics" enumerates the features common to Romanesque buildings irrespective of their geographical distribution. The remainder of the text matter appears in the form of short introductions before the several sections in which the plates of the buildings shown are grouped according to their geographical classification.

"CHURCH BUILDING"—*By Ralph Adams Cram*
(A NEW AND REVISED EDITION)

THE improvement which has accompanied the progress of American architecture during recent years has been no more marked in any department than in that of an ecclesiastical nature. This has been due primarily to the rise of a few architects who by travel and study have acquired much of the point of view from which worked the builders of the beautiful structures which during the fourteenth century and the fifteenth were being built over all of Europe.

These architects have closely studied the churches, chapels, convents and other similar buildings in England, France, Spain and elsewhere, and the result has been a number of American churches of an excellence so marked that they have influenced ecclesiastical architecture in general and have led a distinct advance toward a vastly better standard. This improvement has not been exclusively in the matter of design, for plans of older buildings have been adapted to present-day needs, and old forms have been applied to purposes which are wholly new.

THE appearance of a new and revised edition of a work which is by far the best in its field records this progress. Mr. Cram, being perhaps the leader among the architects who have led this advance, is himself the one individual best qualified to write regarding the betterment of ecclesiastical architecture. The editions of this work of 1900 and 1914, which have for some time been out of print, have now been considerably revised and much entirely new matter has been added, which in view of the change which has come over ecclesiastical building of every nature is both significant and helpful.

Illustrations used in this new edition of "Church Building" show the best of recent work—views of churches and chapels large and small, in town and country, buildings rich in material and design and others plain to the point of severity, with the sole ornament in the use of fine proportions and correct lines. Part of the work deals with the accessories of the churches and their worship.

345 pages, 6 x 9 inches, Price $7.50
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THE 62ND CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS

FOLLOWING a long standing custom of holding meetings one year away from Washington and the next two years in Washington, members of the Institute met at the Hotel Mayflower in Washington from April 23 to April 26, for their annual convention. It was two years since the architects last met in Washington, and it was very appropriate that this year the principal subject to be brought before the convention should be the great building program of the United States government and the development of the national capital. Following the opening address by the president, C. Herrick Hammond, of Chicago, an interesting report by Horace W. Peaslee, Chairman of the Committee on the National Capital, was read, followed by the report of Milton B. Medary, Chairman of the Committee on Public Works. The morning session on Tuesday was concluded by an instructive address by Colonel Ulysses S. Grant, III, in which he described in an interesting way the new government buildings and their location in relation to the L'Enfant plan and the plan by McKim, Burnham and Olmsted of 1900. The afternoon session on Tuesday was devoted to the reading and discussion of various reports.

The most colorful event on the convention program took place at the Corcoran Gallery of Art on Tuesday evening, where before a distinguished gathering, including many prominent government officials, their wives and friends and the delegates to the convention of the Institute, the former president, Milton B. Medary, of Philadelphia, was presented by Andrew J. Mellon, Secretary of the Treasury, with the Gold Medal of the Institute. Before this presentation J. Monroe Hewlett, Chairman of the Committee on Allied Arts, delivered the citation, in which he expressed the warm admiration and deep appreciation the American Institute of Architects feels for Mr. Medary, as a man of exemplary and outstanding character, as an architect of great ability, and as a past president of the Institute whose contribution to the advancement of American architecture has been unsurpassed by that of any one of the other great architects to whom the Gold Medal of the Institute has previously been awarded. The presentation of this model to Mr. Medary is a source of sincere satisfaction and gratification to every member of the American Institute of Architects. The morning and afternoon sessions of Wednesday were largely devoted to a continuation and discussion of the interesting reports of the many committees of the board of directors. Addresses by William T. Foster on "Modern Economics" and by Nat G. Walker on "The Architect in the Small Community" were given after the actual business of these two sessions. On Wednesday evening Professor William Emerson, head of the Architectural School of the Massachusetts Institute of Technology, presided over an interesting meeting devoted to the subject of Architectural Education. On this subject a valuable and instructive address by Frederick P. Keppel, head of the Carnegie Foundation, was delivered. At this evening session the Fine Arts Medal of the American Institute of Architects was awarded to the distinguished young mural painter of Mexico, Diego Rivera, whose remarkable series of mural paintings on the walls of the new Palace of Education in Mexico are already familiar to American artists and architects, and the Craftsmanship Medal of the American Institute of Architects was awarded to Cheney Brothers, of South Manchester, Conn., for their outstanding contribution to the development and advancement of art in industry. The morning and afternoon sessions of the convention on Thursday were devoted to the conclusion of the report of the board of directors and to the election of officers and directors. Following a long established precedent, the officers elected at the convention in St. Louis one year ago were reëlected.

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On Thursday evening the Secretary of the Treasury invited the delegates attending the convention to be his guests at the auditorium of the Chamber of Commerce of the United States, where an exhibition illustrating the plans of the Treasury Department for the group of executive buildings in the triangle area was being held. Unfortunately, the number of available tickets for this reception was so limited that only a few of the delegates to the convention were able to attend. The actual ending of the convention took place on Friday in New York, where the Architectural League entertained the visiting members of the Institute at the Exposition of Architecture and Allied Arts at the Grand Central Palace, followed at the Hotel Roosevelt, by the annual dinner of the American Institute of Architects which was held in conjunction with the Architectural League of New York, the Society of Beaux-Arts Architects, and the New York Building Congress.

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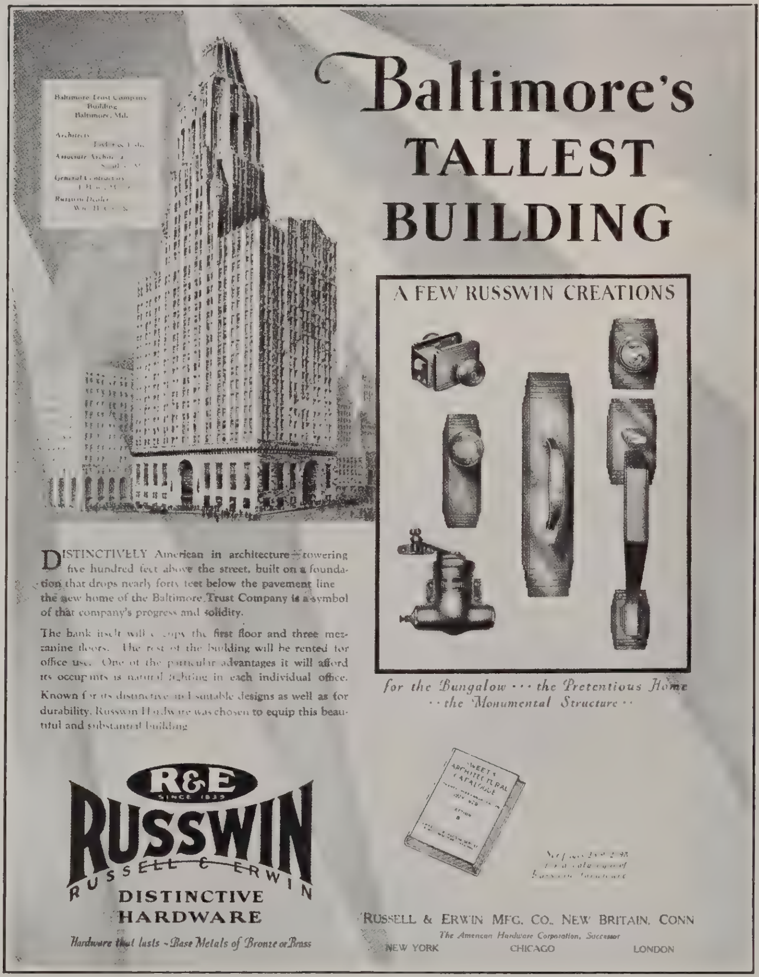

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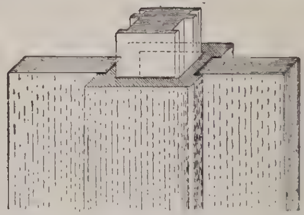

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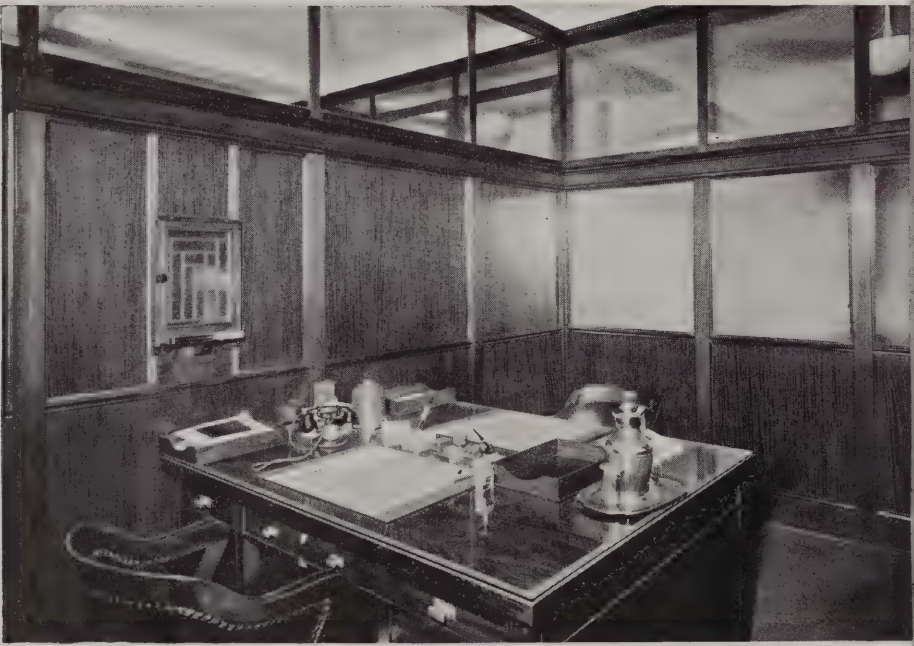

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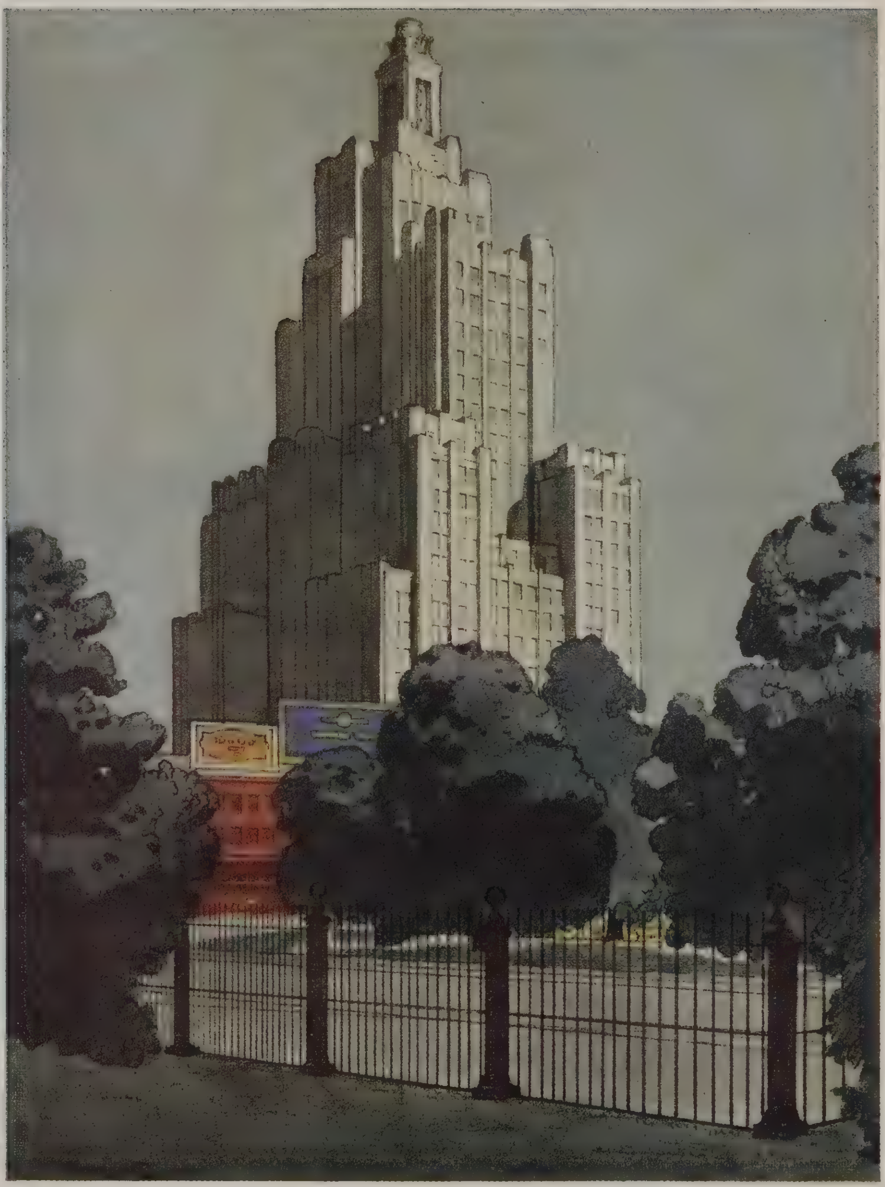

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GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

From a Water Color Drawing by Norman C. Reeves

THE
ARCHITECTURAL
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VOLUME L — NUMBER FIVE
MAY 1929

INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

WALKER & GILLETTE, ARCHITECTS. GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT.

BY

M. P. GREGORY

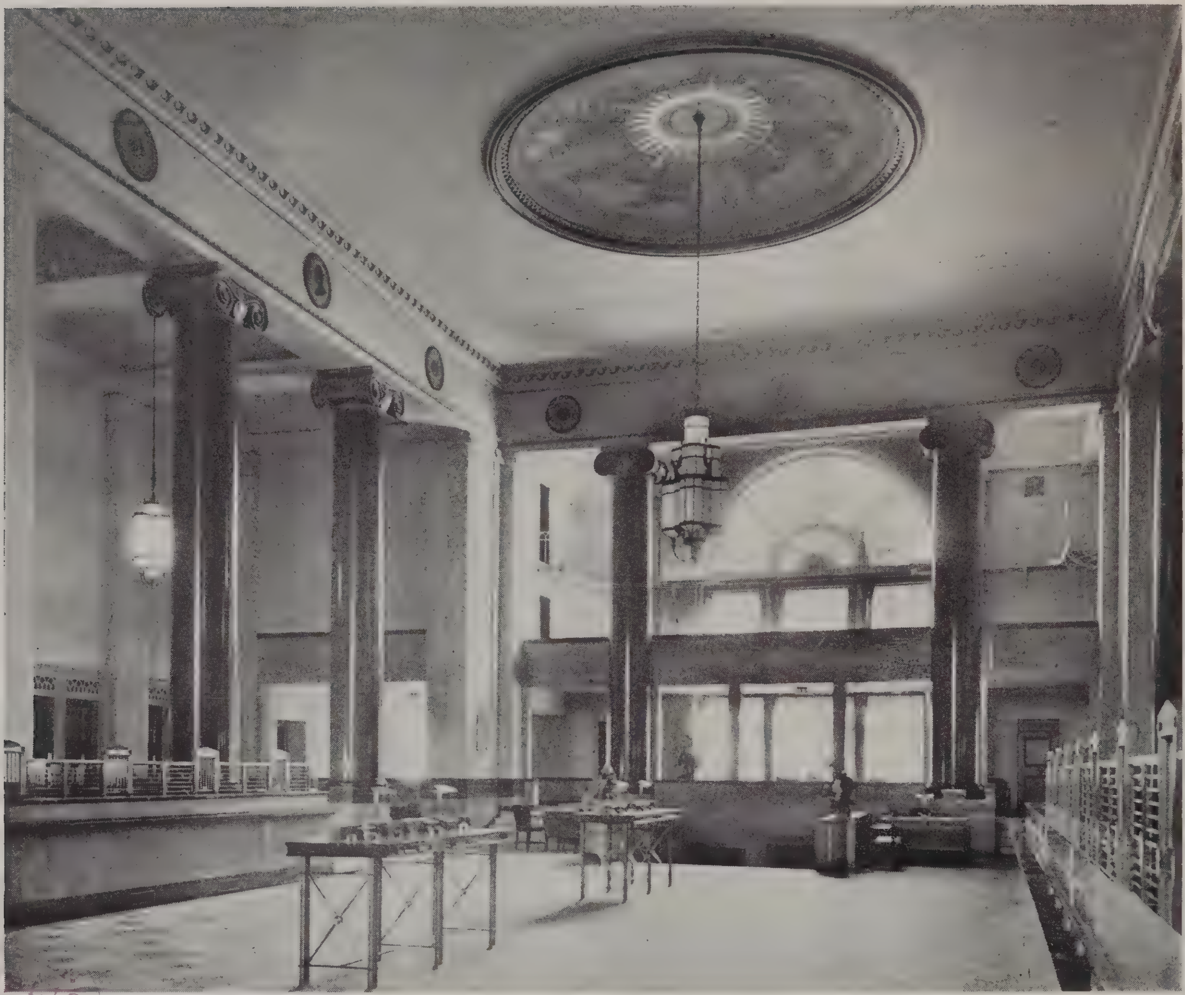
FEW passengers on the trains which go from New York to Boston fail to see the tall "modern looking" skyscraper recently erected across the plaza from the railroad station in Providence. It would be noticeable anywhere, but in a New England city it is particularly striking, rising as it does to a great height over the surrounding country and towering far above the other buildings near it. This new addition to the skyscraper family is the home of the Industrial Trust Company, though in its upper reaches, and seemingly swung in mid-air, are the offices of firms of various sorts. The directory of the building is a fairly representative cross section of the prosperous business activities of the community.

There are countless elements to be considered in judging the architectural merits of a building of this general character,—the uses for which the structure is intended; the economic conditions governing the site and type of building; the point of view of the executives of the bank; the available resources; and, last but not least, the point of view of the designers. This large and soaring structure came as a result of a logical consideration of the first two elements mentioned. Housing for a large bank was a primary requisite, with accommodations for a number of good-sized offices with air, light, and spaciousness. The cost of land in any necessarily central location in Providence was prohibitive. It is not only in Providence that the answer to that combination of requirements has been a skyscraper. That advertising power and publicity were considered as active factors seems likely. That they are successful factors is attributable to the advantage taken of the site by the designers, but it is well to bear in mind that the modern and much maligned skyscraper silhouette is here justified, not as a publicity stunt but as a matter of design.

On closer examination of the exterior, one finds that what detail there is, is more or less conventional. The architects, Walker & Gillette, were fortunate in one respect. They did not have to bring a towering weight of stone to rest on a foundation of glass shop fronts, as is the case with most of the great hotels and commercial buildings in New York. The weight of this structure is carried to the ground visibly and in a logical manner. The building is actually 26 stories high, and its steel bones are sheathed with honed limestone, which has something of the texture of concrete, with the color and richness of the natural stone. The base is made more solid and substantial by the use of granite which harmonizes well with the limestone and gives added character and richness to the building's exterior.

From the west,—from the railroad station,—one approaches the building across an open park and a broad street. From the east one becomes conscious of it as a vertical mass shadowing a narrow, crowded thoroughfare. These facades, both of equal importance, are identical save for the subject matter in the carved reliefs, which, appropriately enough, give a series of scenes from the history of Rhode Island. This same interrupted band of flat sculpture is carried around the south side of the building also; to the north, however, adjoining buildings take away the wall space, and there an arcade is incorporated in the building, running straight through the structure and giving the public access to the general offices in the building without passage through the bank.

Throughout the building there is evident the lavish and successful use of materials. On entering the Industrial Trust Company's main banking room this fact undoubtedly contributes to the reassuring consciousness one has of ease and well being. The entrance hall is really a landing stage between the savings department of the bank, which is below the level of the street, and the main room, a short flight above. Here is an example of how a limitation imposed on an architect can often be successfully surmounted and lead, as in this instance, to an interesting and original innovation. This feature is not brought out very clearly in the illustrations, but it is a very ingenious solution of a difficult problem.



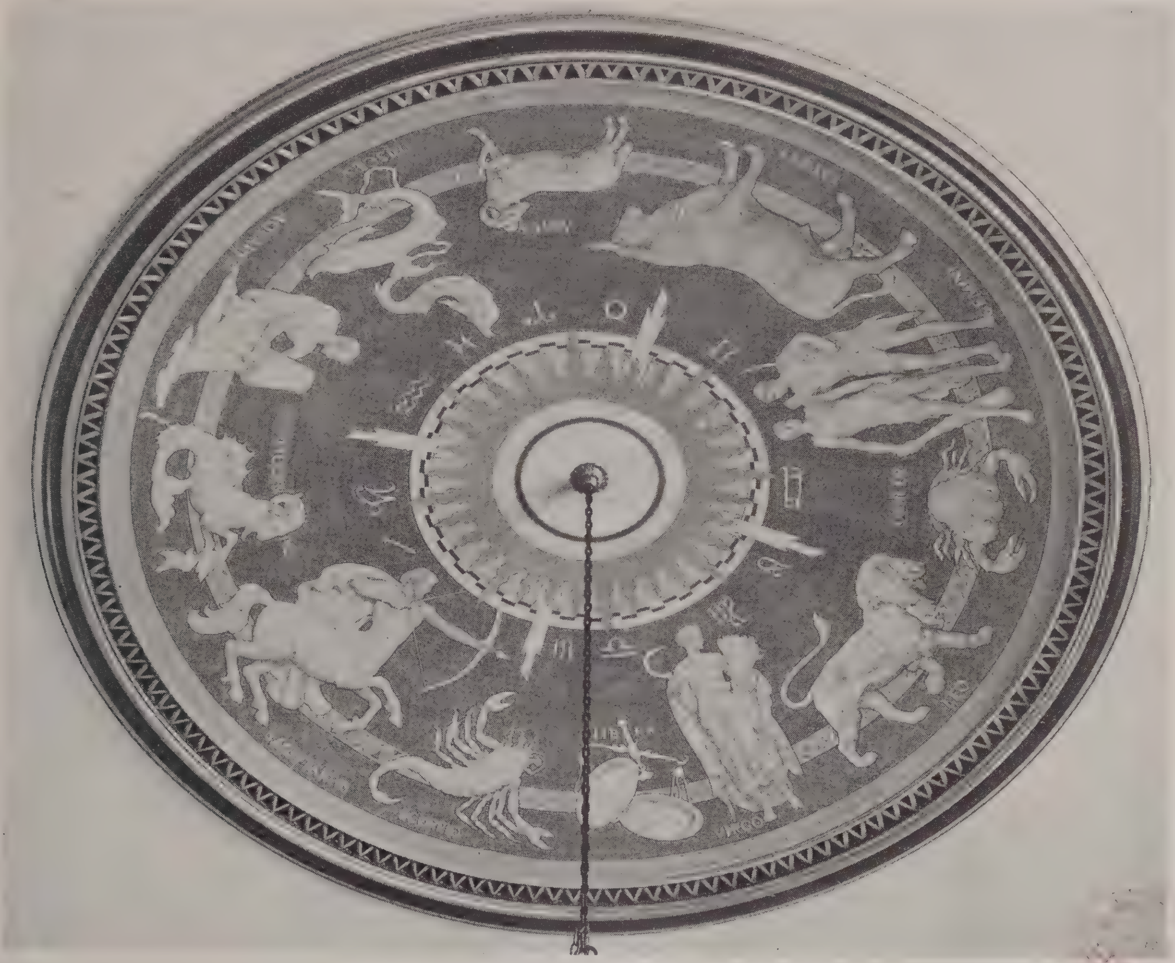
LIBRARY

Photos. Sigurd Fischer

Main Banking Room, Industrial Trust Company Building, Providence

It converts an awkward situation into a convenience, and does not detract too much, artistically speaking, from the approach to the main area.

This main room is quite as impressive as it was intended to be. Massive marble columns extend down the lofty room; they are elevated for added dignity and height on square pedestals. Here, as in the exterior, there is a compromise between the traditional and the modern style in architecture. The blending is so skillful that it is hard to say where one leaves off and the other begins. One might say it was Empire "with a difference." Most of the detail undoubtedly had its original inspiration from the Greek, with many variations, additions, and attenuations. But the temptation to analyze and search for origins is usually futile, even if irresistible. The success of this room is largely a question of the use of restraint and a skillful harmonization of color. The accompanying illustrations of course fail completely in showing this and in doing justice to the room, and this must be borne in mind when looking at them. The illustrations also fail to give the impression of loftiness which one receives on mounting the steps from the entrance, and they give a false effect of spottiness and unrest. The room is quite adequately lighted by very tall wide windows at either end. A clever combining and matching of marbles has had much to do with the success of the room, and advantage was taken of the different light effects on slabs placed horizontally and vertically. The wall lining of the entrance hall, some of the inserts in the paving of the banking room, parts of the counters and the 16 columns are of gray marble. In the columns the marble is a cloudy black and in the paving and in the hall there is a pearl-gray cast to it. The Empire feeling of the room is attributable to the black and terra cotta color scheme and to the details. The columns are Ionic and of the barest simplicity, carrying a much compressed architrave free from all decoration save medallions. These coin-like medallions with black silhouetted profiles, and the large saucer-shaped medallion with the signs of the zodiac which decorates the ceiling have as a background the terra cotta red of Greek vases.

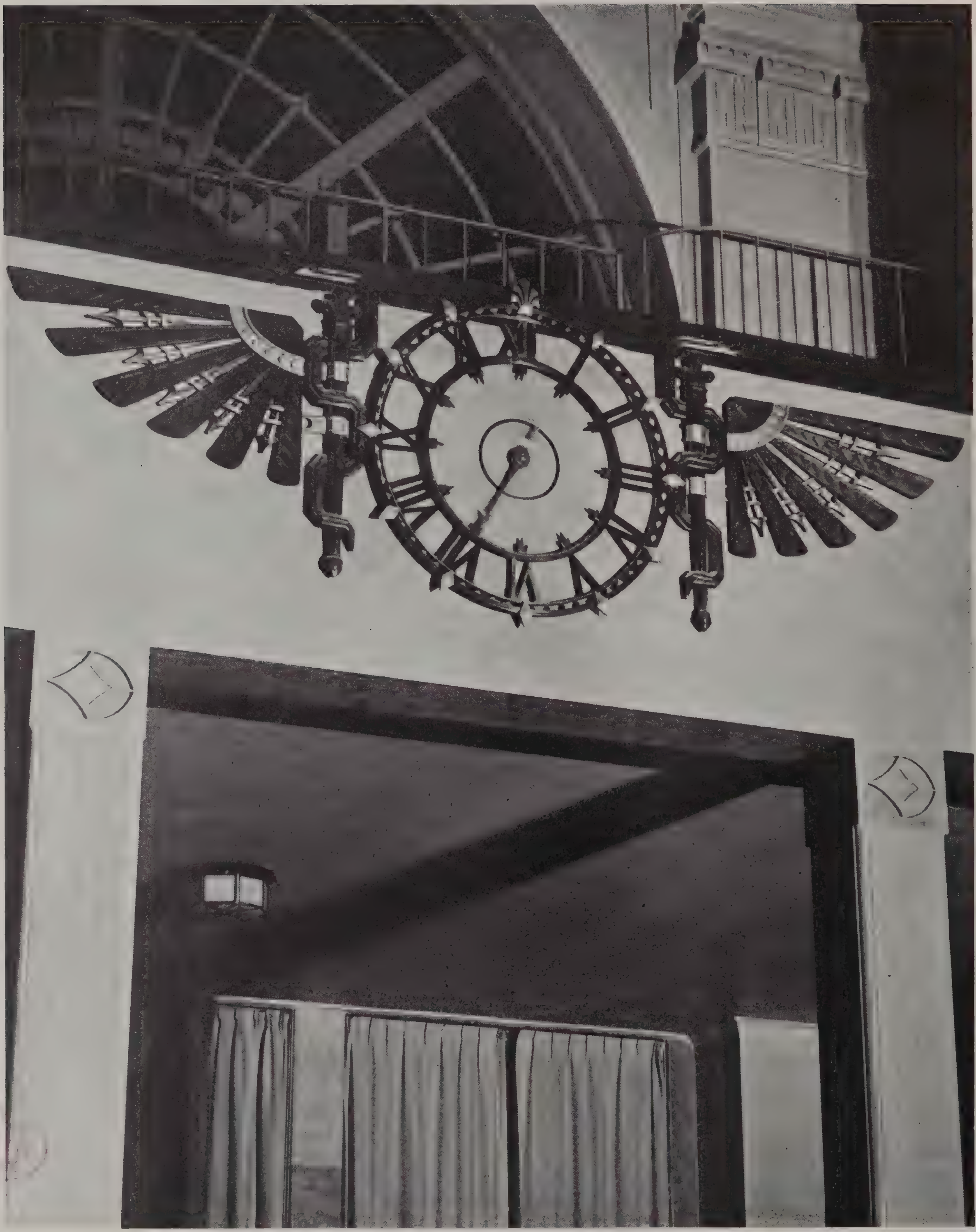


Medallion in Ceiling of Main Banking Room

The figures are not the least modern in either feeling or execution. This terra cotta color is used not only in the upper part of the room but finds an echo in the inserts of red marble used in the pavement, and in a band or frieze below the top shelf of the tellers' cages. These "cages," no longer cages in modern banks, but railed off counters, line up along each side of the room, and are designed for accessibility and harmonization, again in a very restrained and simple design. The bronze grille has been given a gun metal finish which repeats the luster of the columns and of the counter. Four of the 16 columns are slightly engaged in a partition wall, and though one regrets this necessity, the best has been made of the difficulty. A description of the room is not complete without mention of the lighting fixtures, which carry out in miniature the skyscraper outline of the building,—not in detail, but in shape and feeling. This device is something like a motif or key which prevails throughout the public parts of the bank and which testifies to the attention and care which have been lavished on the building's details.

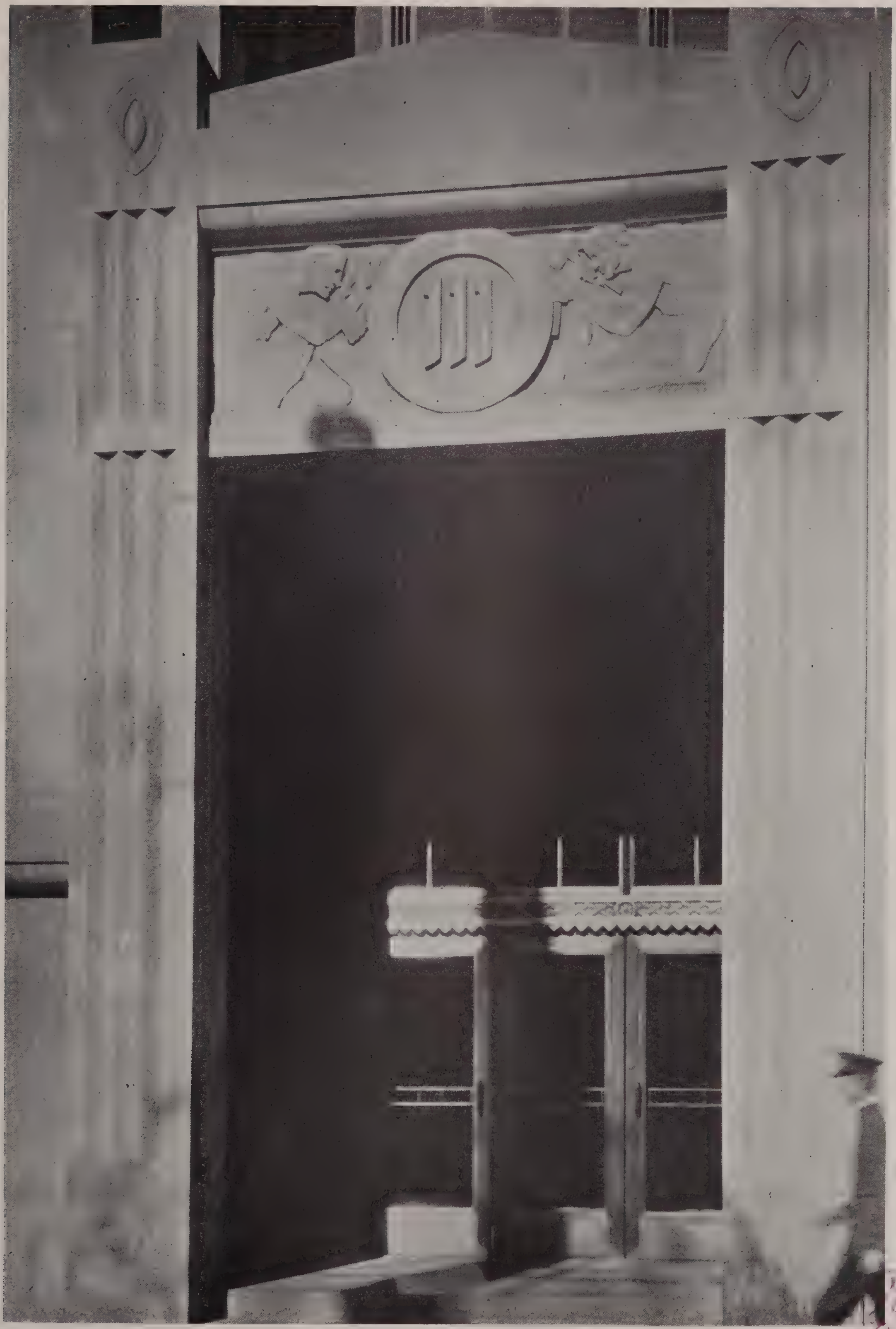
If, as has been said, the purpose of fine architecture is to enclose space, to enhance consciousness and submerge personality, then this room fulfills in some measure such a purpose. The architects are, to be sure, met more than half way by the requirements of modern banks for spaciousness and rich accessories, and by their willingness to spend large sums of money to attract and please the fickle public. So that where the Greeks found an opportunity for full expression in design in the wealth provided for their temples, the Byzantines and the early Christians in the coffers of the Church, and the architects of the Renaissance in the patronage of vain and wealthy princes, so the modern bank designers find opportunity from the rich returns of an investing public.

The savings department on the lower floor is less interesting, and of course less magnificent. One has a crowded feeling, partly due to the low ceiling and the restricted window space. A curiously etherialized symbol of an Ionic cap reduced to its lowest and simplest terms is used on the square piers, and we have come a long, long way from the Parthenon when lighting fixtures in the cornice are hidden behind the translucent



Clock in Main Banking Room

panels of what would have been the sculptured triglyphs of a Greek temple! The offices of the directors of the bank and the directors' room are above the main bank. Here one is no longer in a public hall, and there are rugs and paneling and fireplaces. There is a large, low-ceiled outer room, paneled in stained butternut, with a plaster cornice coffered deeply along the lines of the steel ribs. The room creates a calm feeling of rest and well being. In the directors' room all thought of modern architecture has been abandoned, and one enters a thoroughly conservative,



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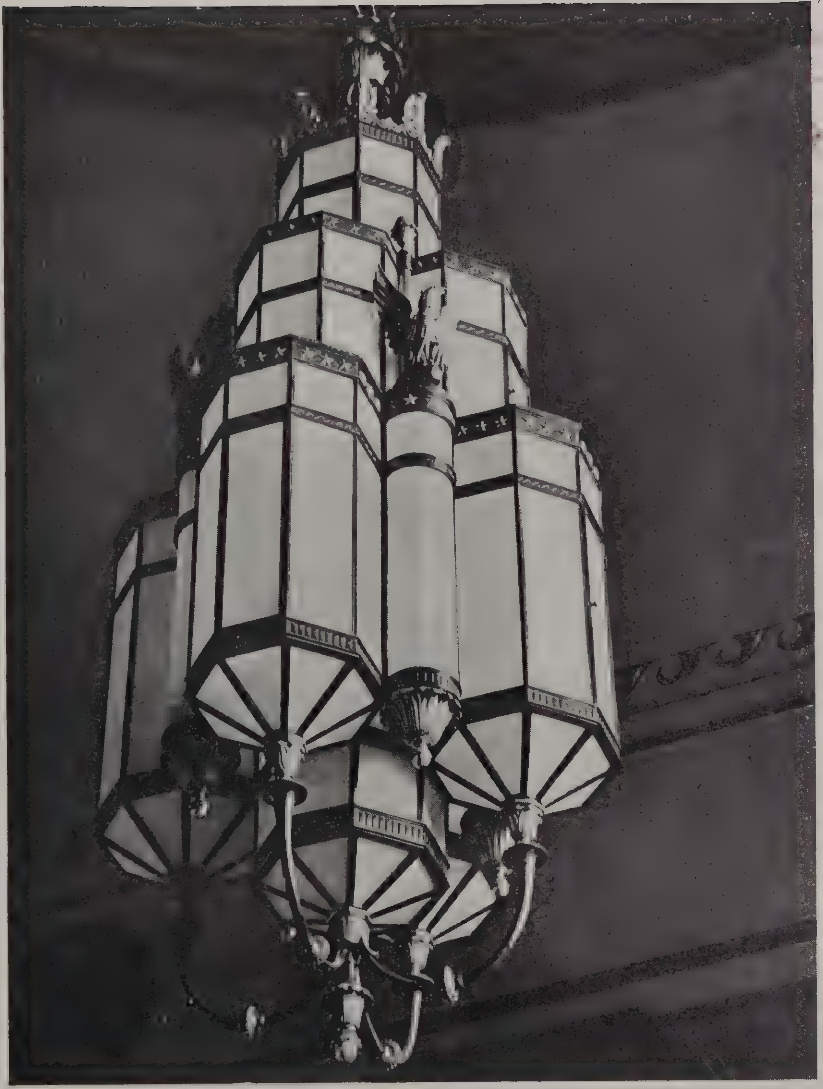
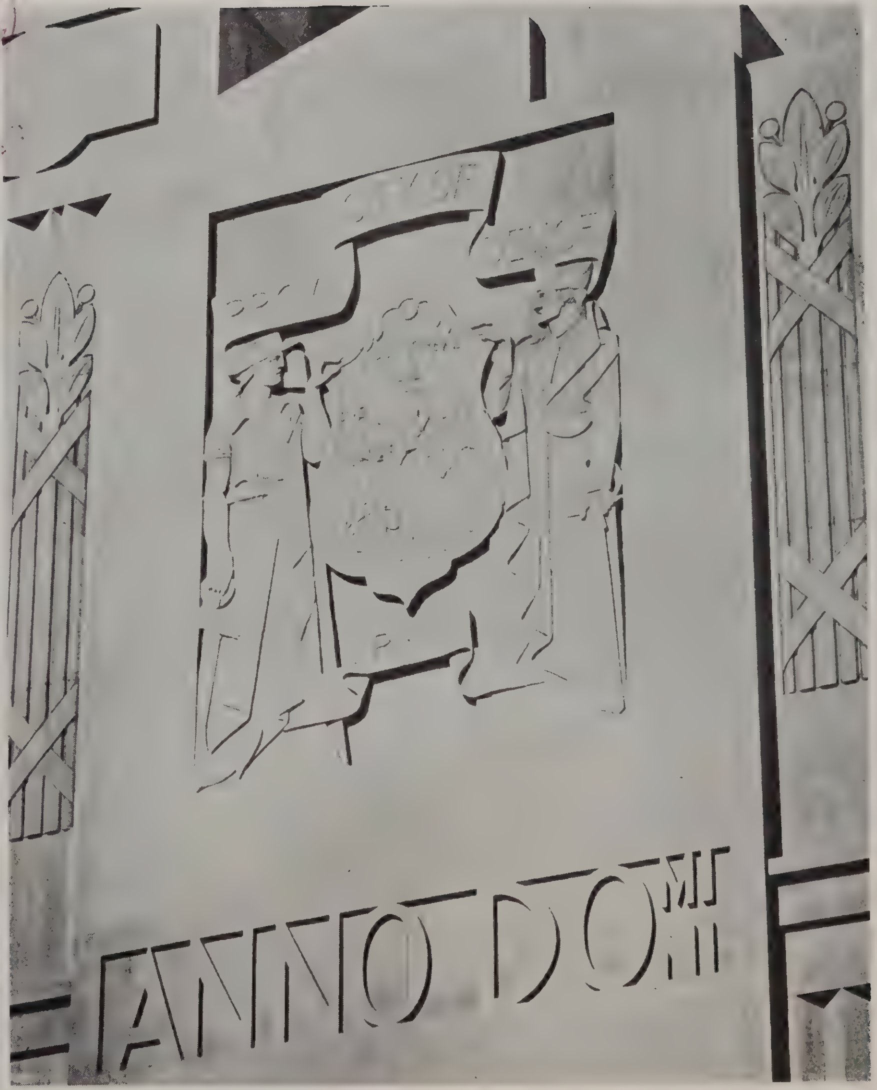
SIDE ENTRANCE
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



LIGHTING FIXTURE IN MAIN BANKING ROOM

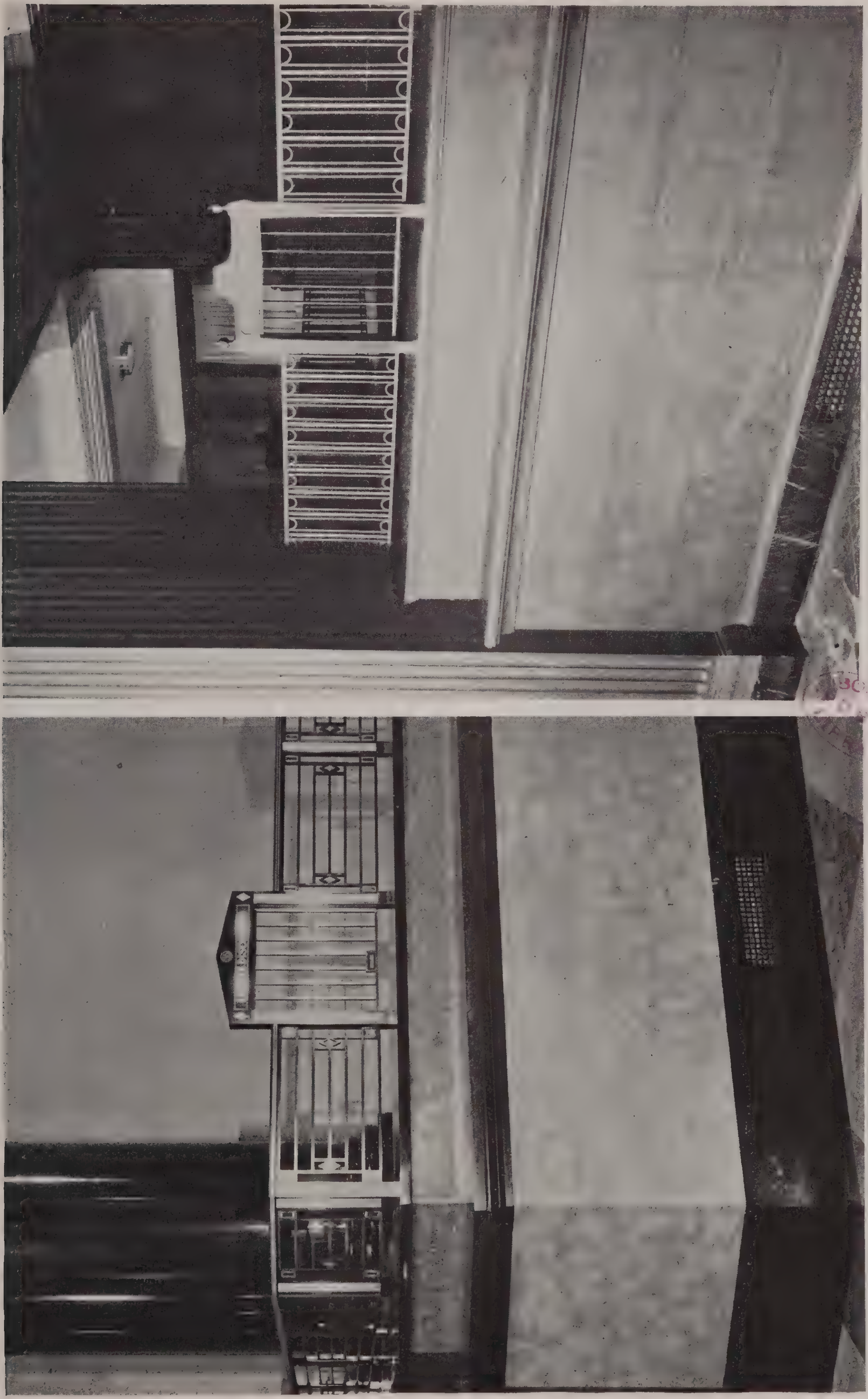


CARVED RELIEF, MAIN ENTRANCE

INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

WALKER & GILLETTE, ARCHITECTS

GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

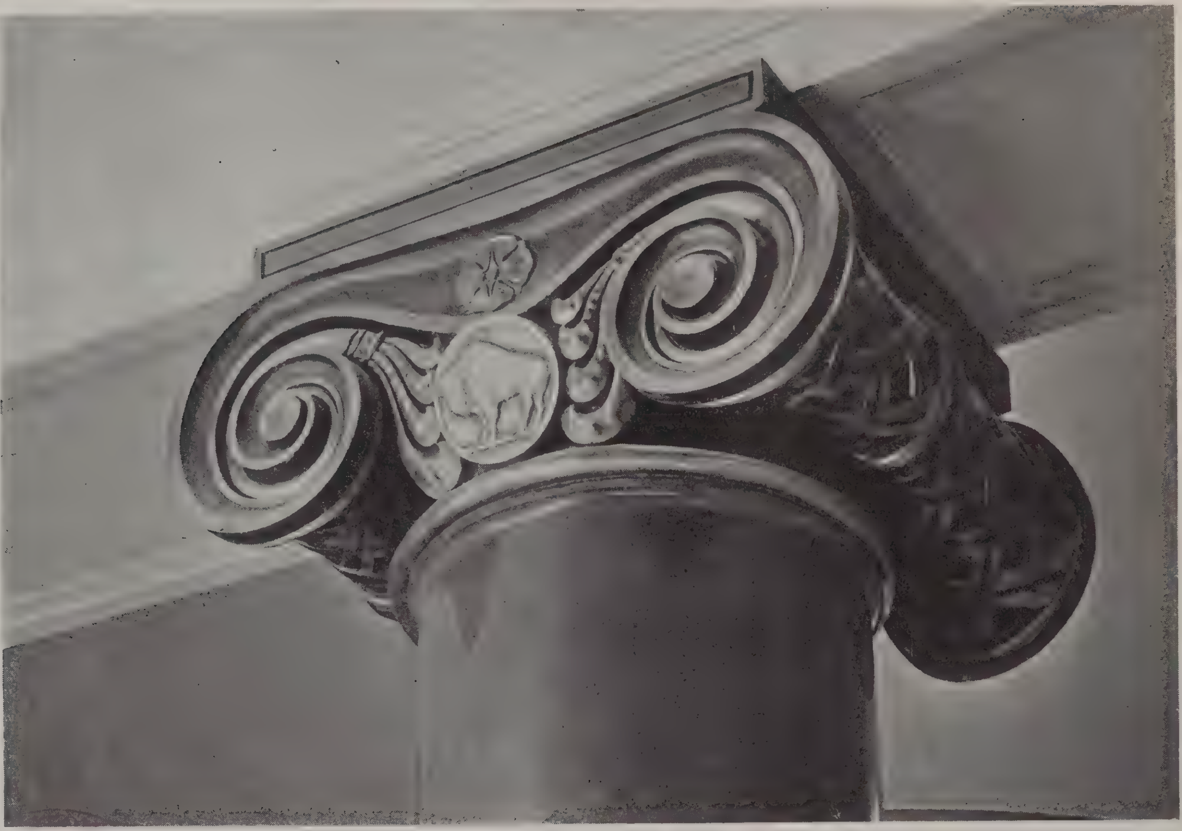


COUNTER SCREENS

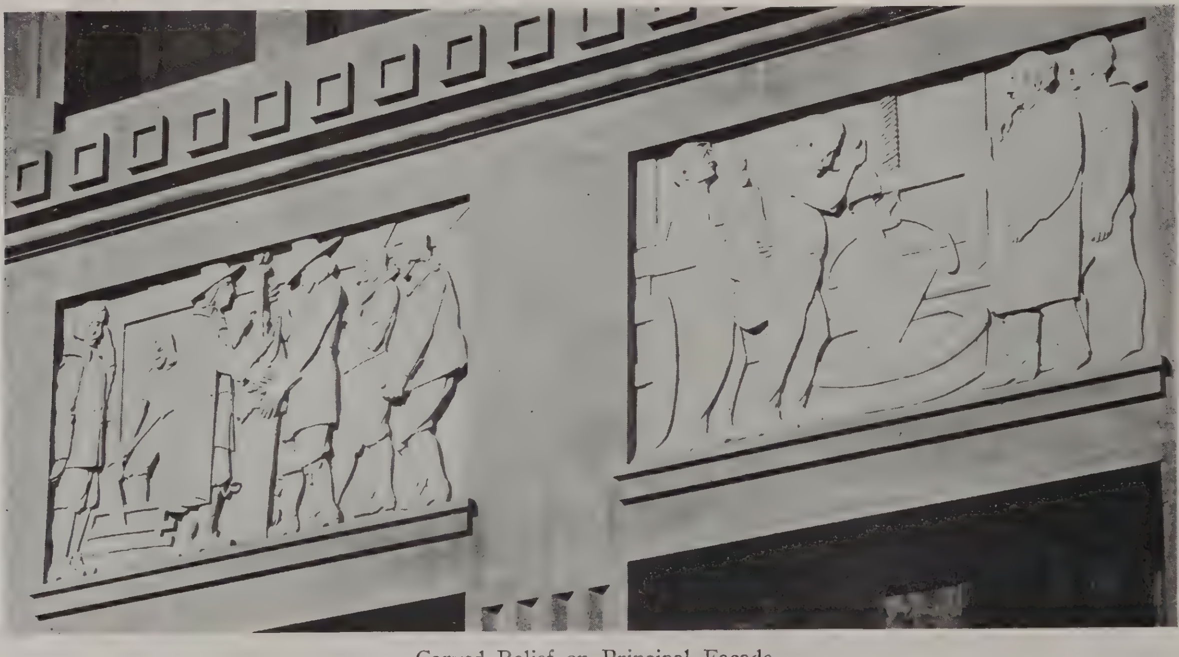
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

WALKER & GILLETTE, ARCHITECTS

GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



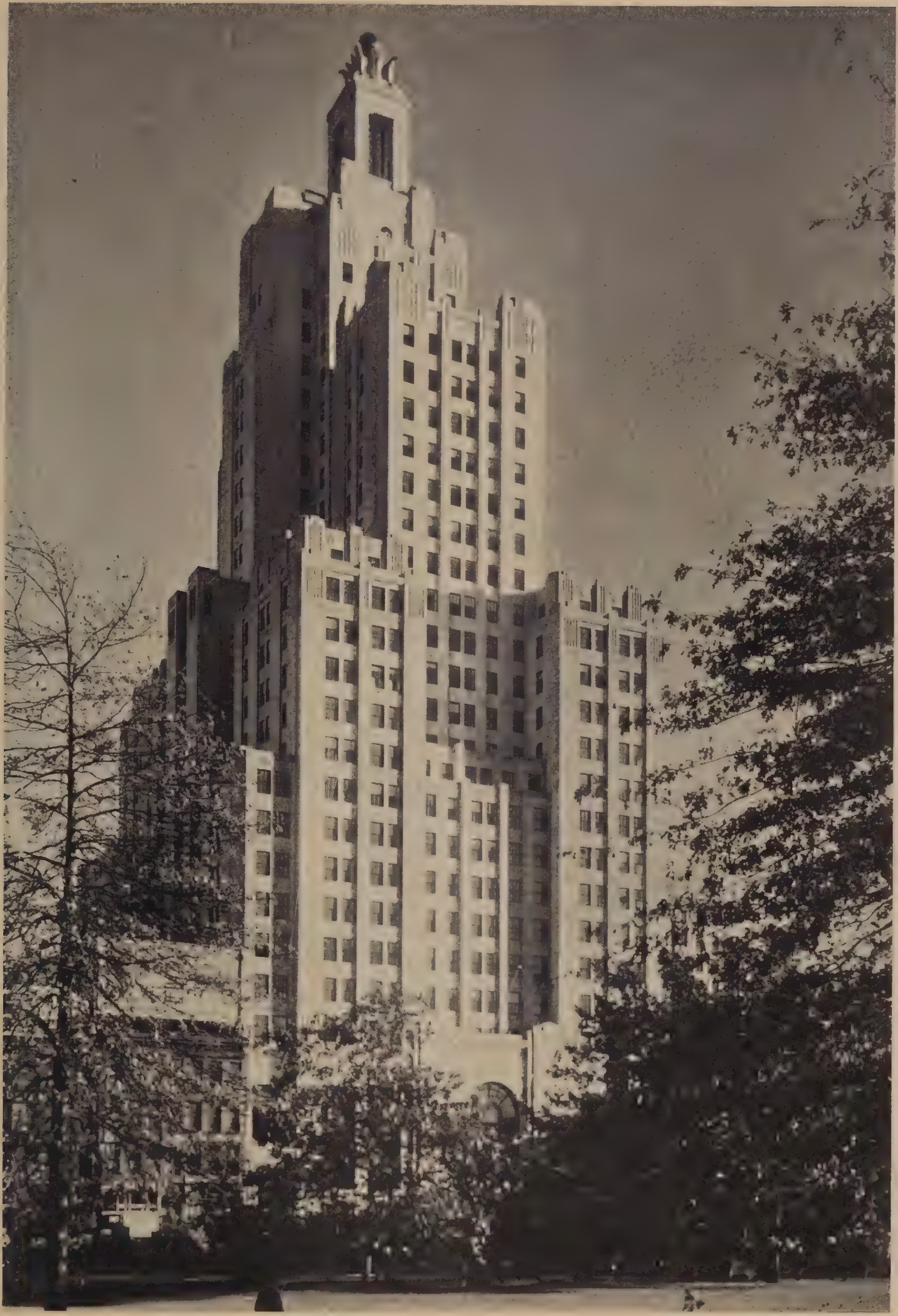
Marble Column in Main Banking Room



Carved Relief on Principal Facade

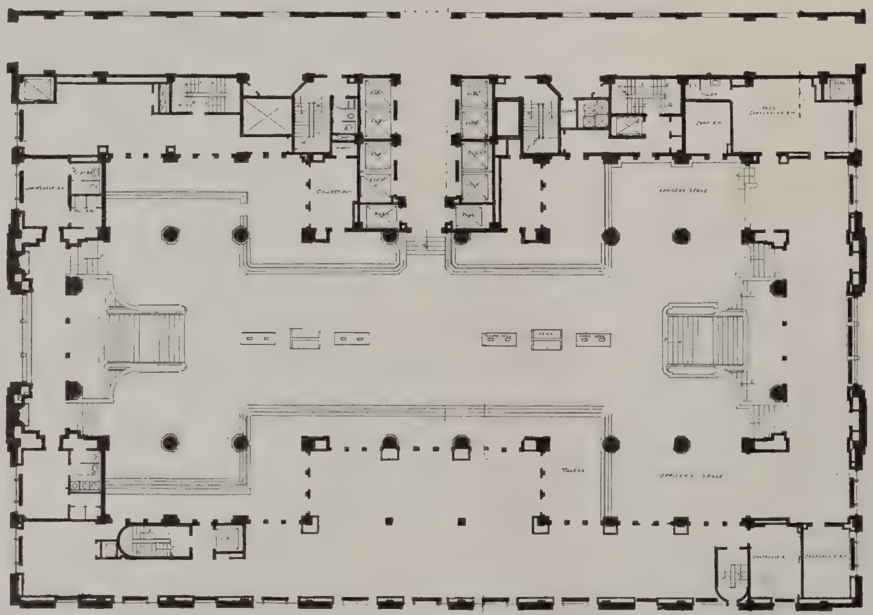
Georgian room—oval, paneled, and painted white.

Below the rooms already described is the steel-encased safe deposit vault, one of the largest in the country. From the boiler room to the top floor, all needs seem to have been thought of and analyzed, and due provision has been made. The logical restrictions imposed by the bank directors have been met and solved by the architects in an efficient and satisfactory manner. Even details such as furniture and decorations have been specially designed and selected by the architects, the entire effect being dignified and architectural.



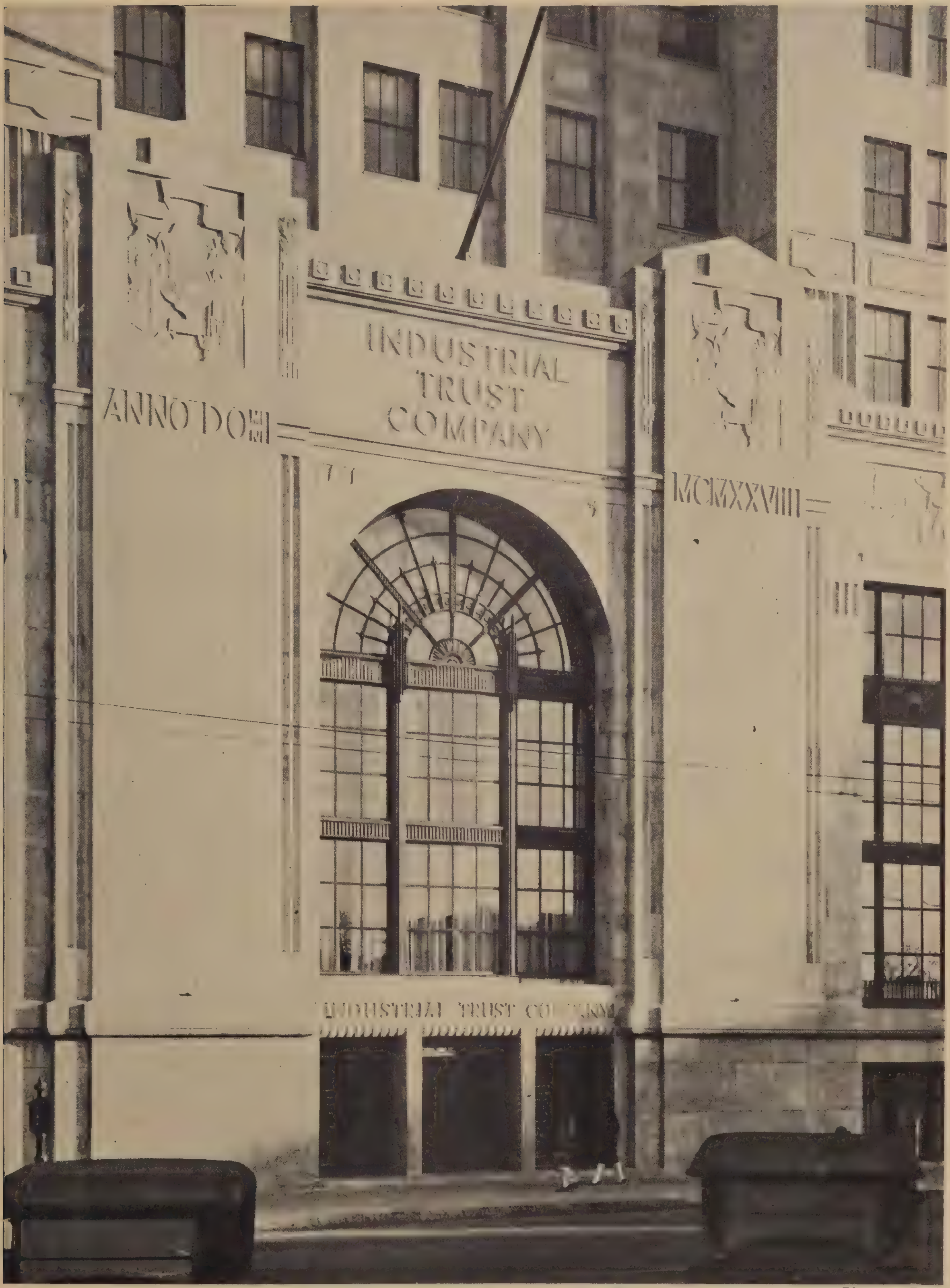
Plan on Back

INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



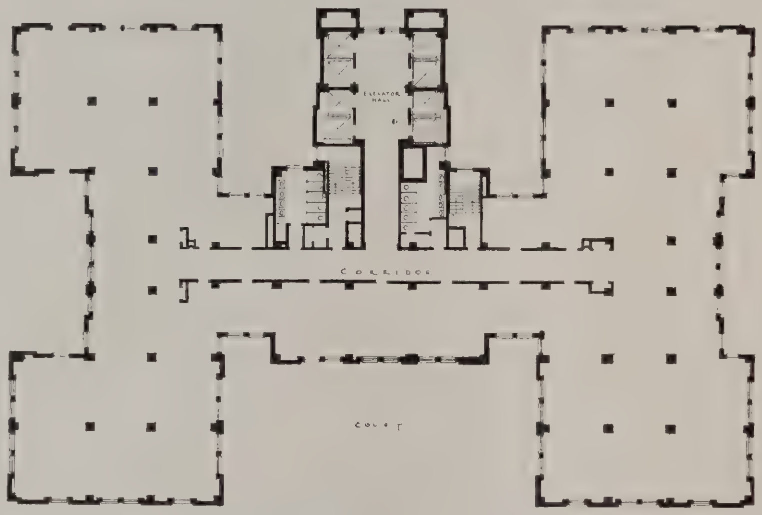
MAIN FLOOR

PLANS. INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

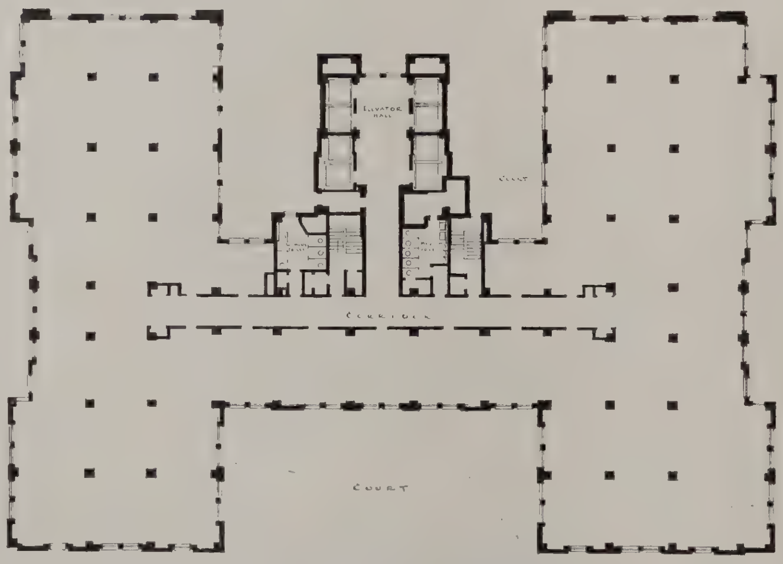


Plans on Back

MAIN ENTRANCE DOOR
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



TENTH TO THIRTEENTH FLOORS

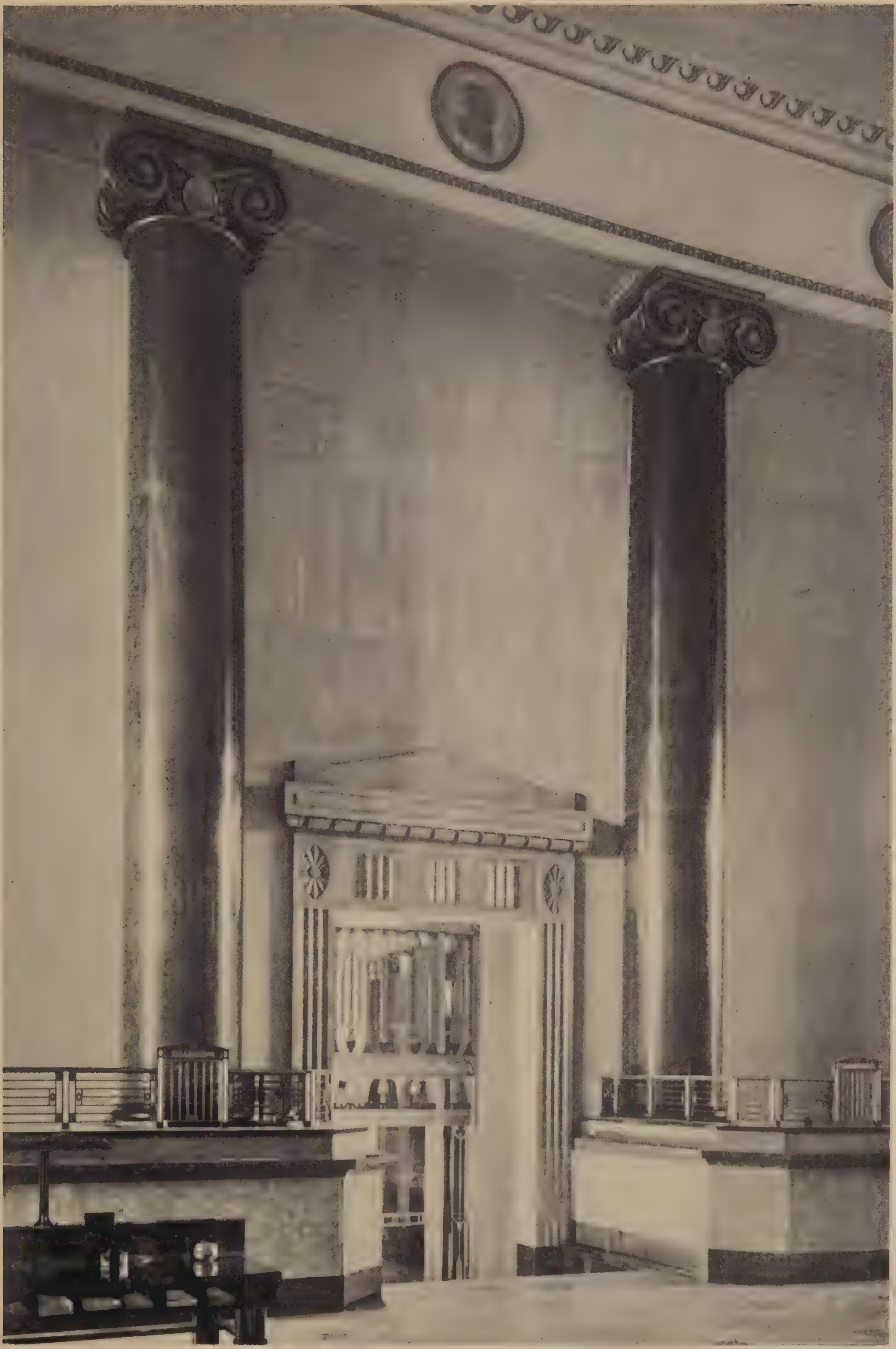


FIFTH TO EIGHTH FLOORS

PLANS. INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

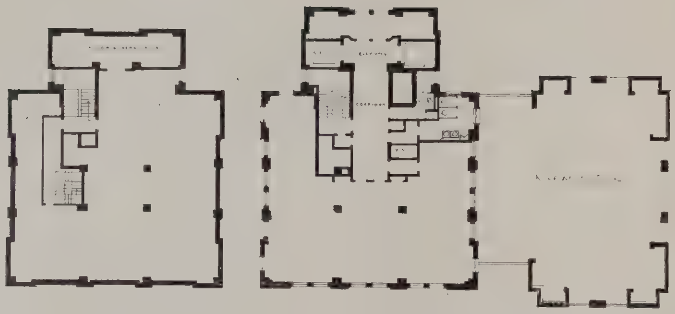
WALKER & GILLETTE, ARCHITECTS

GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

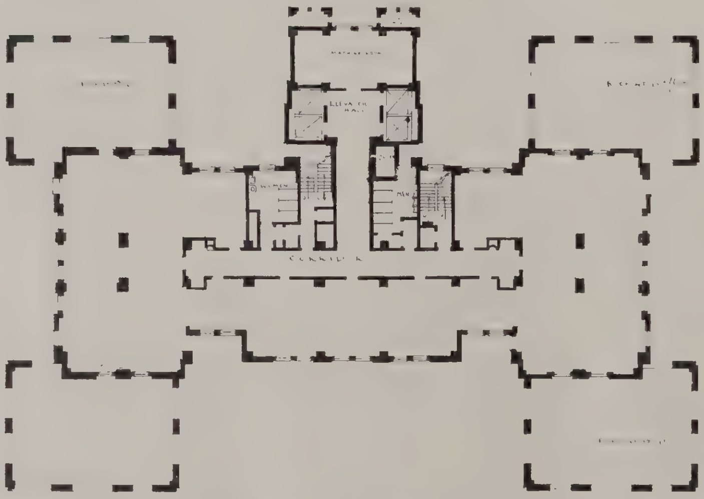


Plans on Back

DOOR BETWEEN MAIN BANKING ROOM AND SAVINGS DEPARTMENT
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

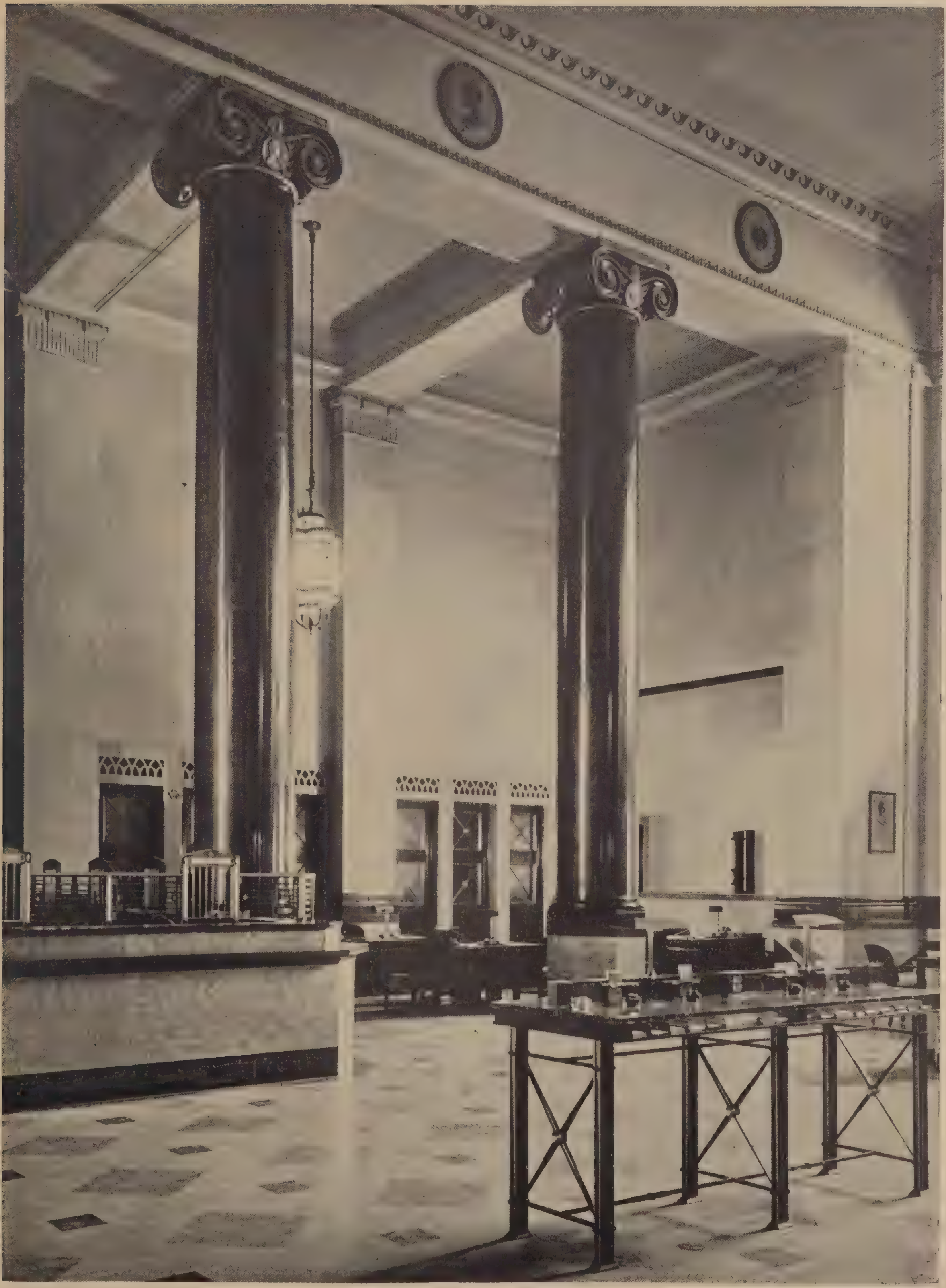


TWENTY-SECOND TO TWENTY-SIXTH FLOORS



FIFTEENTH TO TWENTY-FIRST FLOORS

PLANS. INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

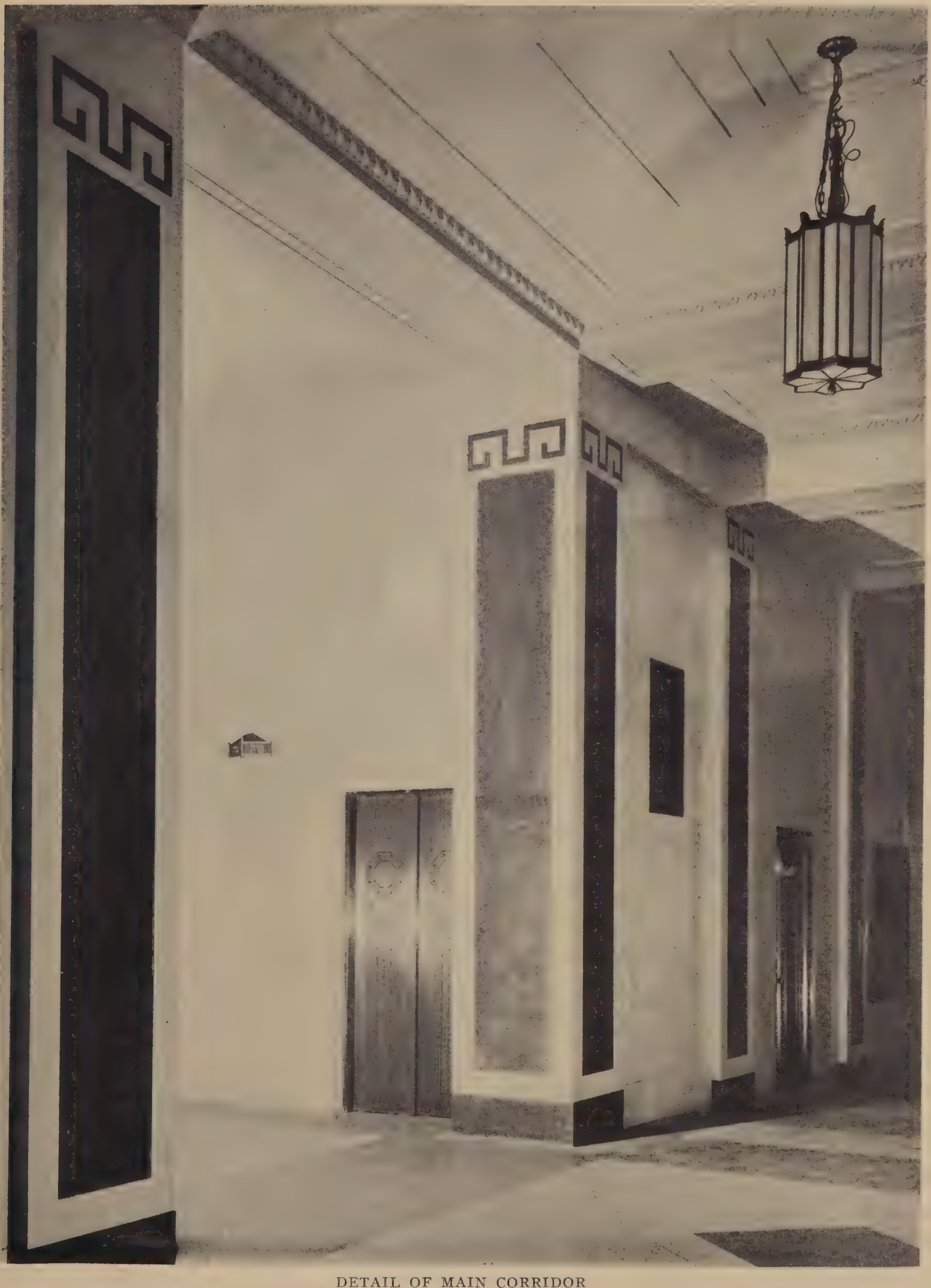


MAIN BANKING ROOM

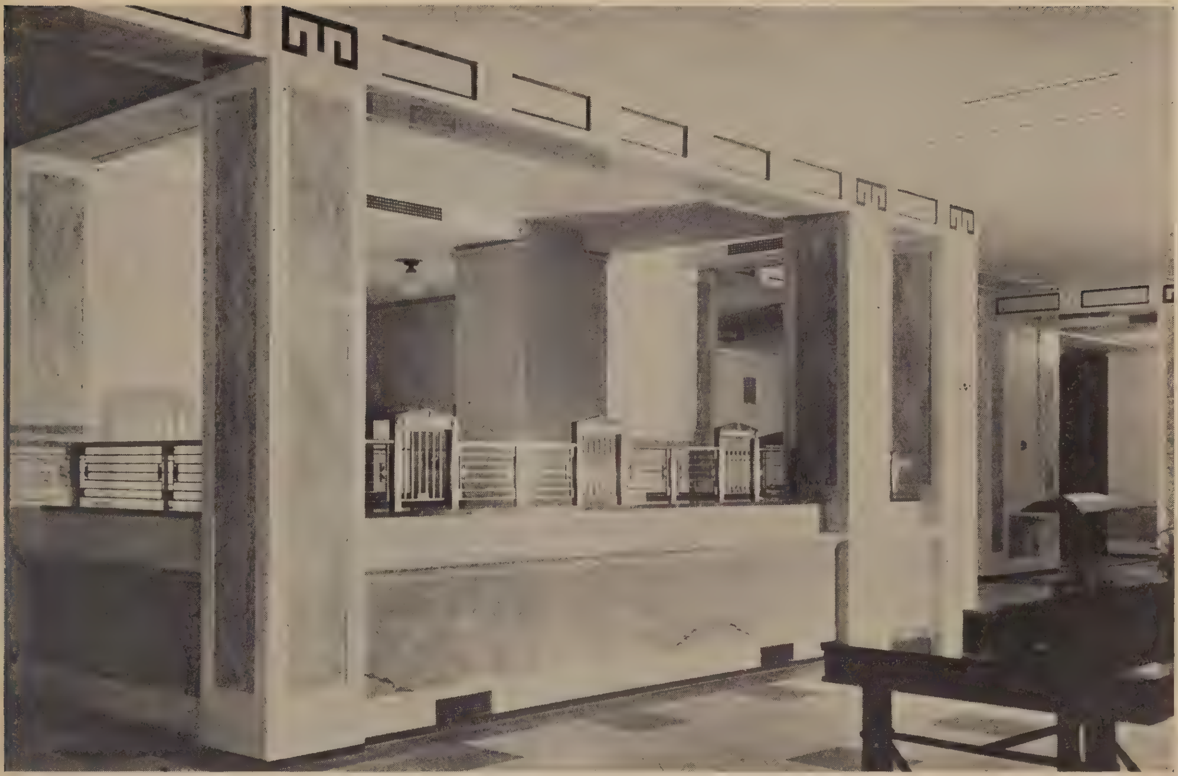
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

WALKER & GILLETTE, ARCHITECTS

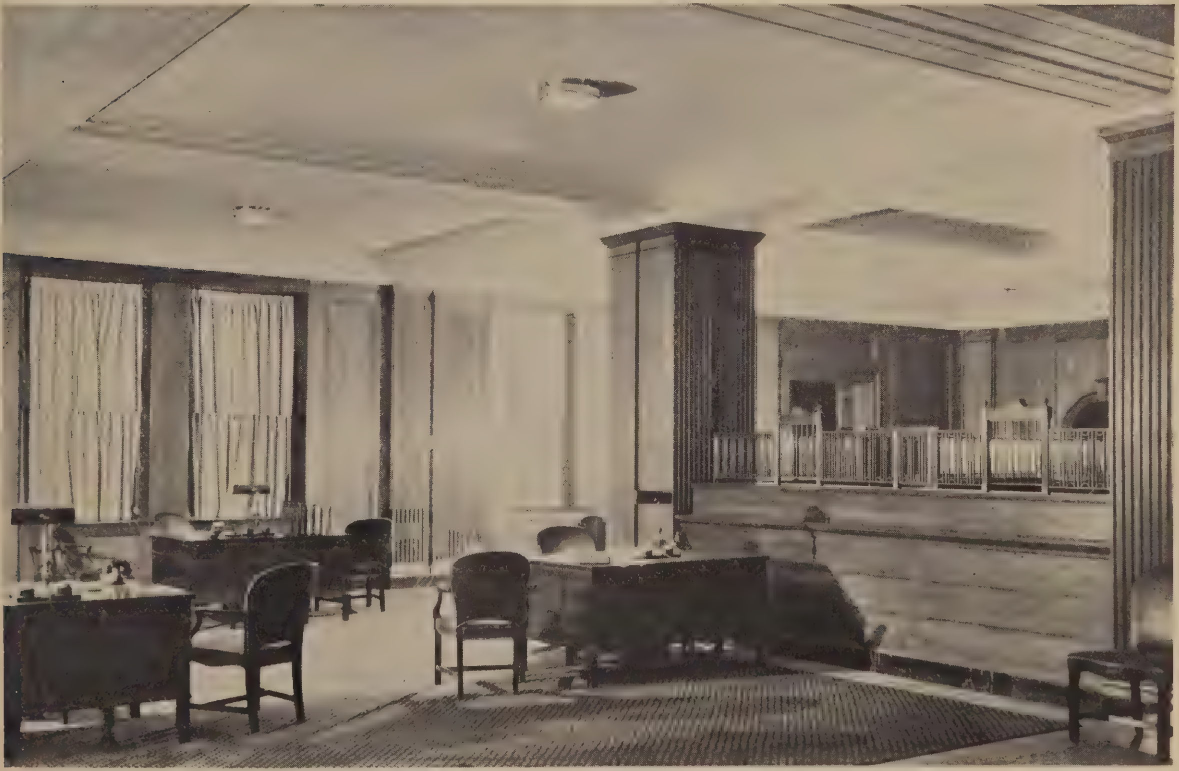
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



DETAIL OF MAIN CORRIDOR
INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE
WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT



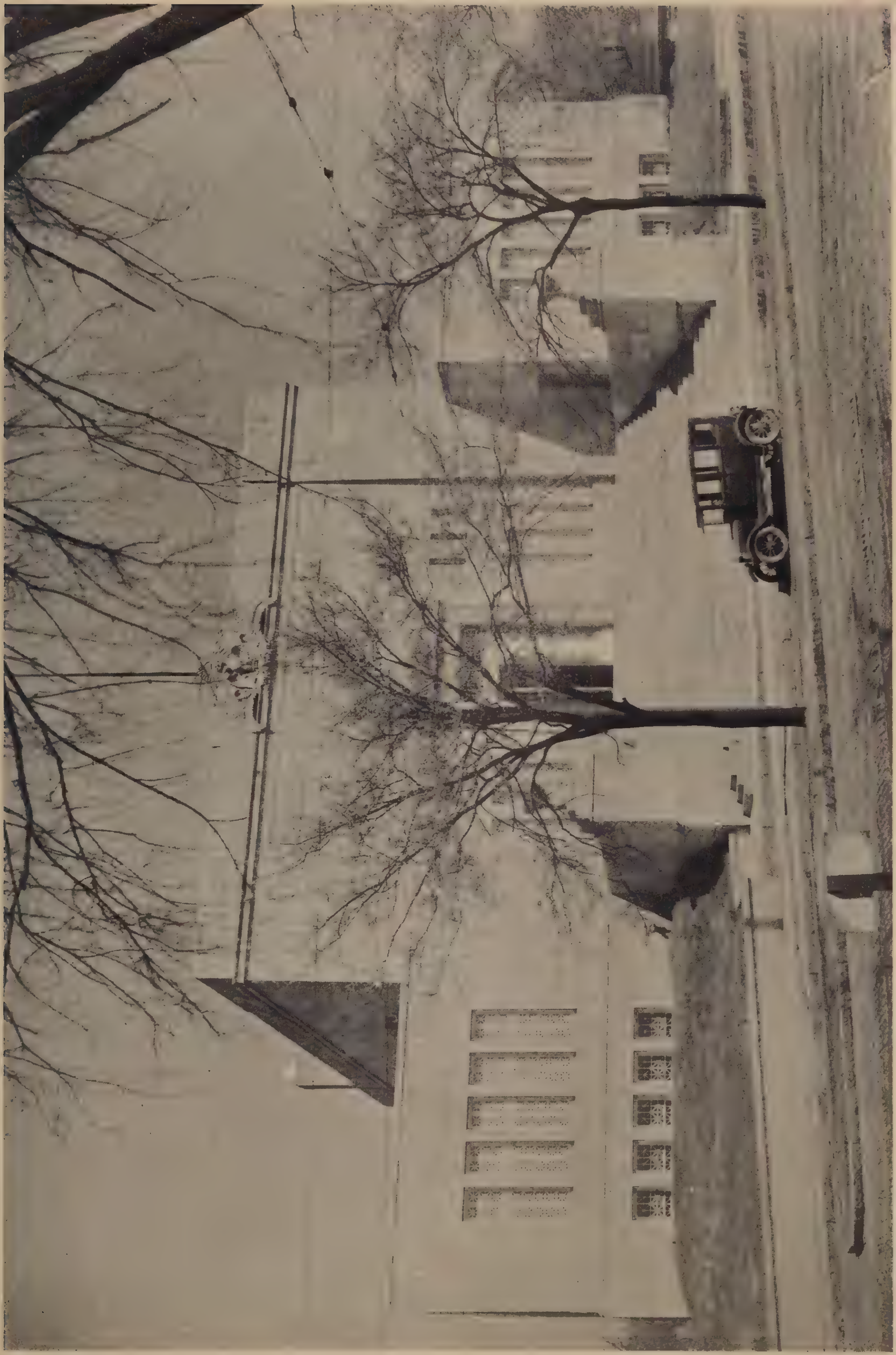
SCREEN, SAVINGS DEPARTMENT, LOWER FLOOR



OFFICERS' AND INVESTMENT ROOM

INDUSTRIAL TRUST COMPANY BUILDING, PROVIDENCE

WALKER & GILLETTE, ARCHITECTS
GEORGE FREDERIC HALL, ASSOCIATE ARCHITECT

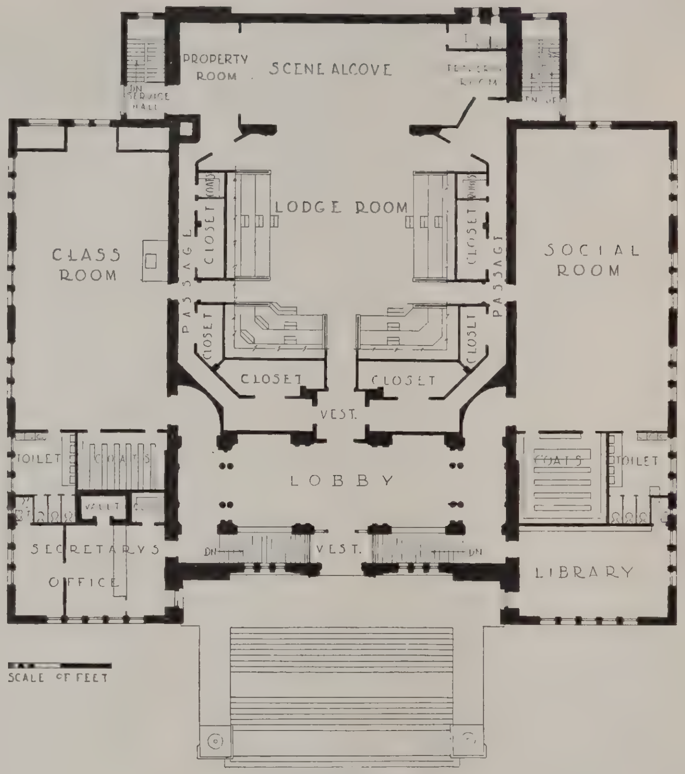


Photos. Tebbs & Knell, Inc.

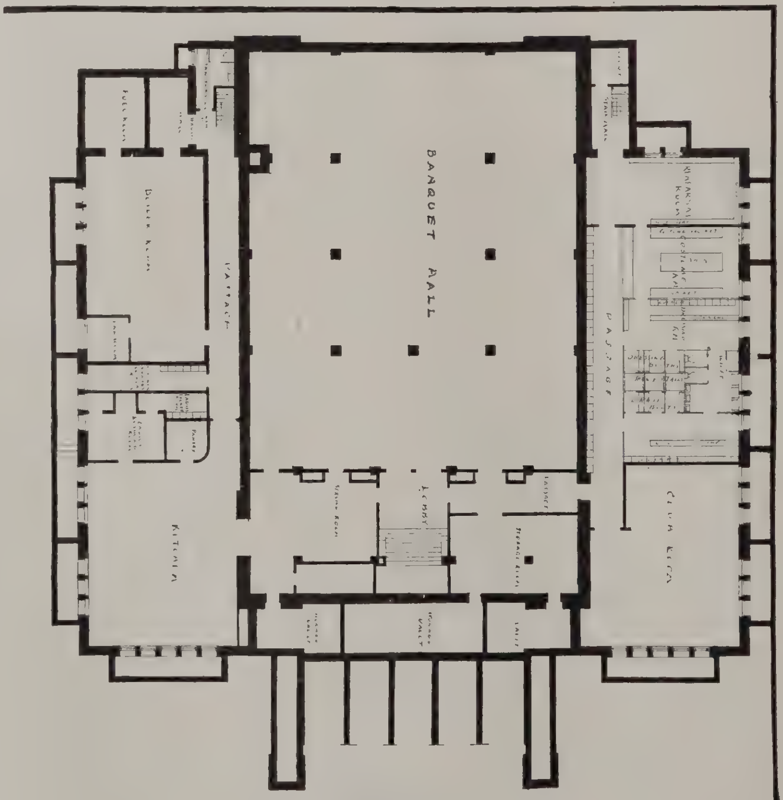
Plans on Back

SCOTTISH RITE TEMPLE, MONTGOMERY, ALA.

H. W. WITCOVER, ARCHITECT



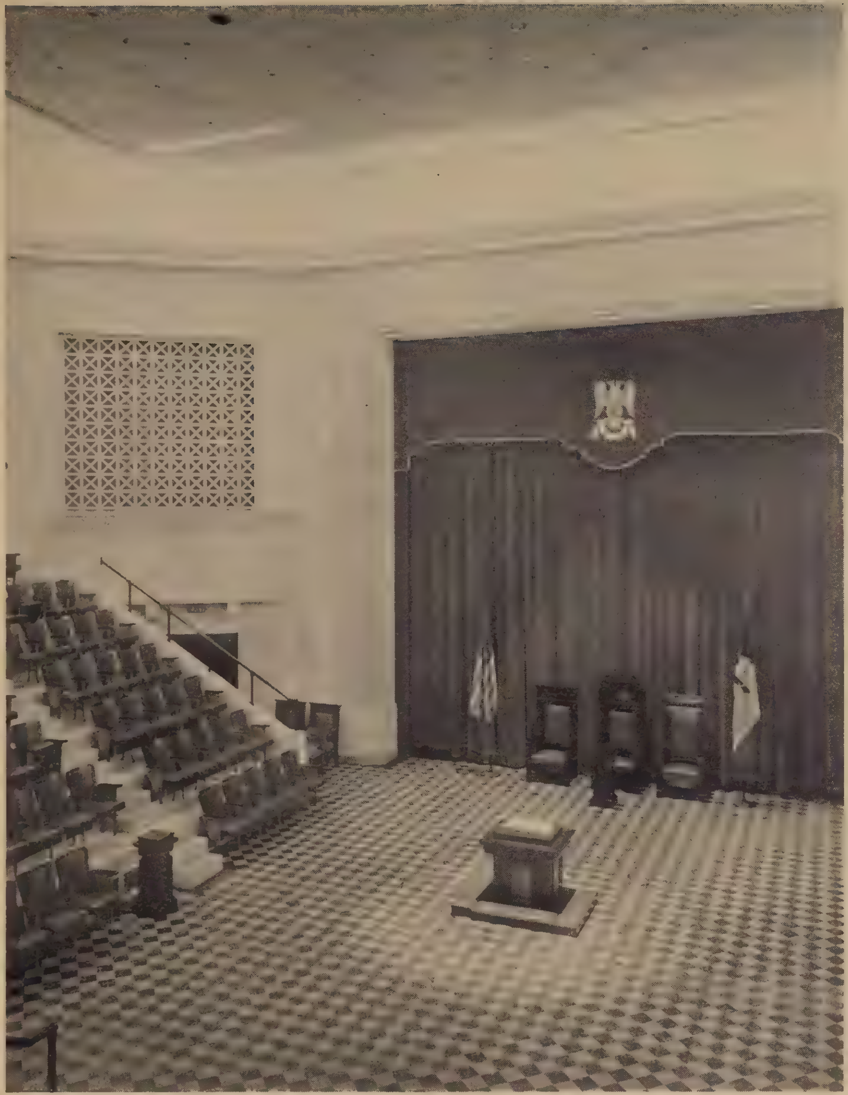
FIRST FLOOR



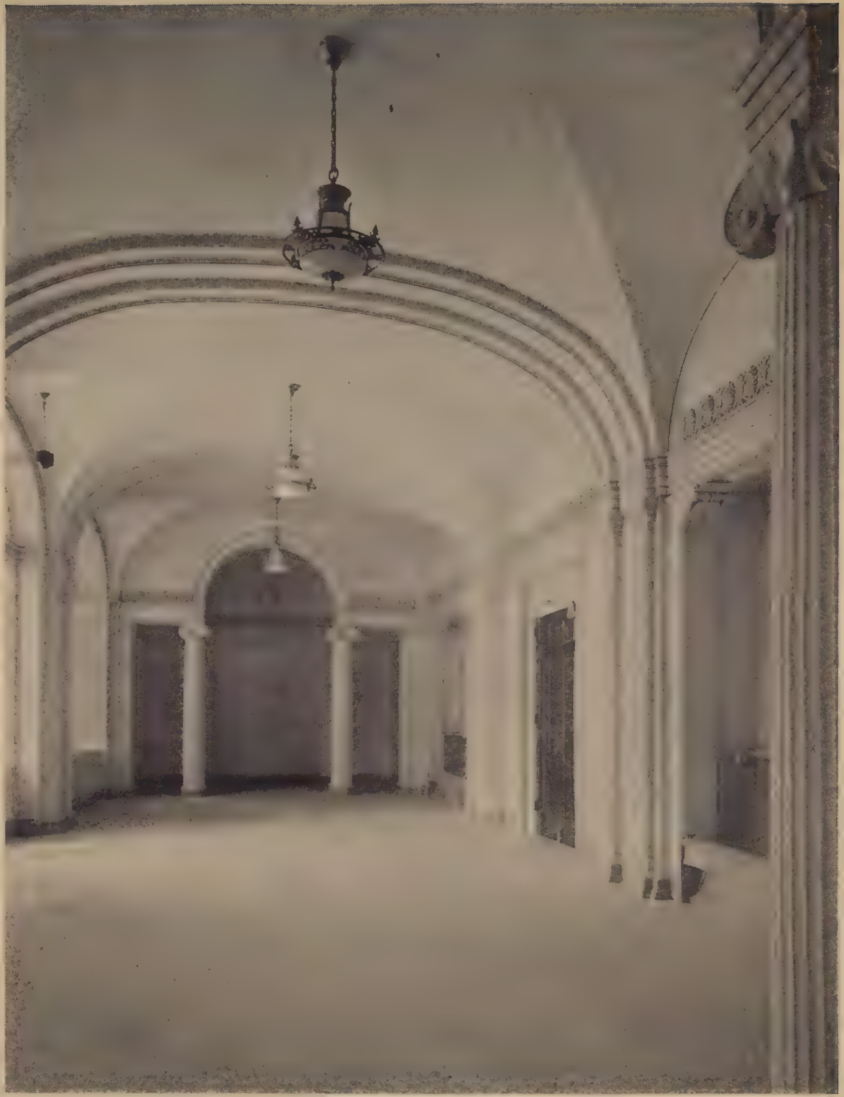
BASEMENT

PLANS. SCOTTISH RITE TEMPLE, MONTGOMERY, ALA.

H. W. WITCOVER, ARCHITECT



LODGE ROOM



ENTRANCE LOBBY

SCOTTISH RITE TEMPLE, MONTGOMERY, ALA.

H. W. WITCOVER, ARCHITECT

THE CHAPEL AT ST. GEORGE'S SCHOOL, NEWPORT

CRAM & FERGUSON, ARCHITECTS

BY

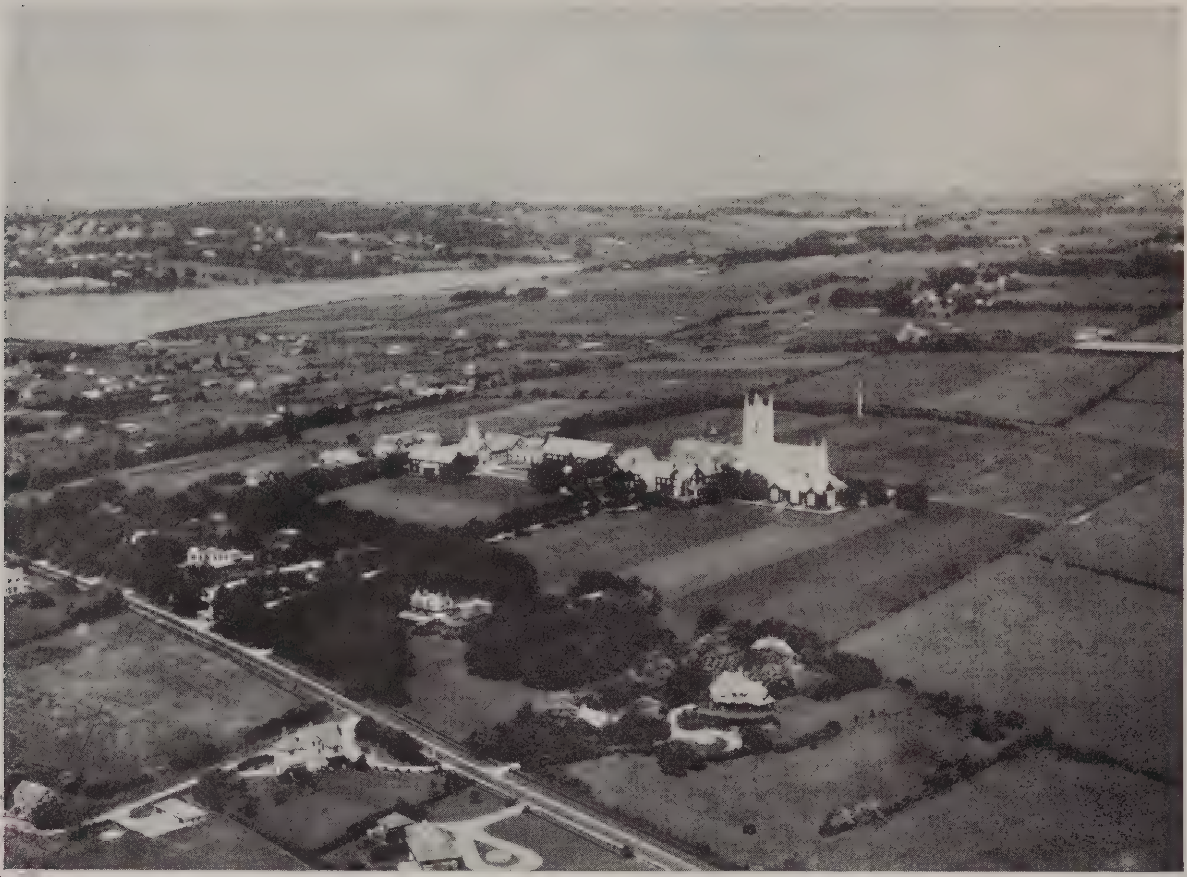
MATLACK PRICE

STUDENTS in the older English schools and colleges, such as Oxford and Cambridge, have been fortunate in the architectural environment in which they spent their most impressionable years. The time of the foundation of those schools and colleges was a period when the prevailing architectural tendencies were fine. With us, school and college environments must be good through design, rather than because of fortuitous circumstances. When most of the buildings of our universities were built,—during the last century,—taste in this country was at a low ebb,—very low. It is only in recent years that taste, in the hands of our more able architects, has done its best to repair the æsthetic mistakes made in the buildings of the 1870's and the 1880's. It was Mr. Cram who once said that the era of the Philadelphia Centennial of 1876 found us, "architecturally, the most savage of peoples."

The American boarding school presents, in miniature, something of the architectural problem of a college or a university, since its activities are, on a smaller scale, quite similar. And in the dream of every school's future there is a complete plan, with dormitories about quadrangles, a library, a refectory, a gymnasium and various other special buildings. It is a dream already realized, in large measure, by St. George's School at Newport. This is a school which has built its history rapidly since its opening in Newport, and there, on a broad hilltop overlooking the Atlantic, the first of the present buildings was erected. The school was incorporated under the laws of Rhode Island in 1900 and re-incorporated in 1907. It was prior to 1907 that the second school building was added to the first,—a structure which combined schoolroom, gymnasium and sixth form living quarters. Gradually the school grew, though not in accordance with the original architectural plan, which grouped various buildings about a quadrangle, with the first building on its north side. Since the magnificent view from the hilltop site is to the south and east, it was deemed unwise to block this, and the buildings which have been added from time to time have been placed to the north and west, except the refectory, which is east of the original building and a little north of it. In the airplane view, shown on page 662, the entire school group is to be seen in its relation to the chapel. From Newport the school is plainly visible on a hill between the two beaches, and far away across Easton's Pond there is the tall square chapel tower, its four pinnacles rising high above the older buildings. The effect is not unlike that of an English cathedral town seen from a great distance, since the elevation of the site, and the scale of the tower in relation to the other buildings create an illusion of greater than actual size.

The chapel, one of the most recent as well as one of the most beautiful works of Cram & Ferguson, lies thus to the compass: the long axis runs east and west; the south elevation faces the old school; the east elevation consists mainly of the sanctuary window, and the north elevation shows the length of the choir-nave and one end of the ante-chapel, above which rises the tower. Except for the tower, there is no west elevation, for at this end the chapel adjoins one of the school buildings, which is, in effect, a not very stylized version of brick-and-stone Tudor,—the character, in fact, of the entire school group, to which the chapel adds Gothic. The plan of the chapel is simple, and should be studied not only in itself but in relationship to its connection with the existing school buildings to the south. It consists of the sanctuary, seen at the end of what would ordinarily be a nave, but which in a school chapel combines nave and choir, in order to seat all the students apart from such visitors as may be seated in the ante-chapel, which occupies the transept, on the transverse axis. Along the south runs a cloister, which leads on the west into the ante-chapel and on the east into the statio or vestibule between the sanctuary and the old school chapel, now the lady chapel. It is this south side which is to be joined to the buildings to the south by two new cloisters, running north and south, with a library over one and sacristies and choir and practice rooms over the other. The fourth side of the cloister garth thus formed will be the present covered walk leading from the old school building to the refectory. When this has been accomplished, the chapel will assume its planned and proper architectural relationship to the earlier school buildings, and the south elevation will show the architects' intention regarding this side.

St. George's School Chapel is such a fine and complete example of the work of Cram & Ferguson that it is more than tempting to make a study of the iconography of both its exterior and interior, if for no other purpose than to renew our appreciation of the charming facility of the Gothic manner for telling stories and preserving symbolism, and to realize anew how much, by scholarly knowledge and studious design, there may be built into a structure of this kind. Before beginning such a detailed study, however, it is interesting to record something of the architects' gen-

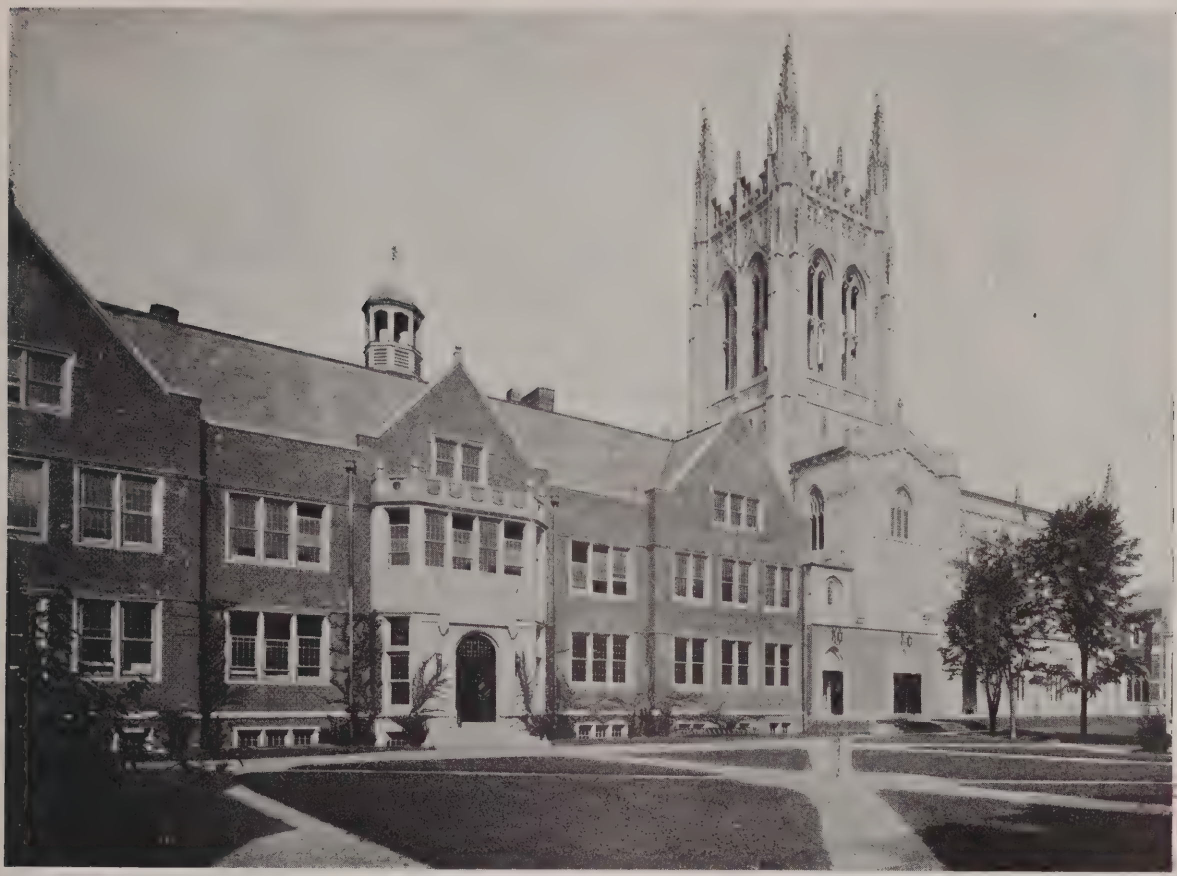


Airport View, St. George's School, Newport

eral premises, something of their *credo* in the matter of church architecture in general, as told to the writer by Mr. Cram. He believes that, whatever else is done, the continuity and traditions of the old churches must be preserved, whether they be Roman Catholic, Anglican, Greek or Hebrew; that the architect must hold to the unchangeable things at the same time that he thinks of them as modernly as the present age may suggest. This preservation of continuity, this consistency, need not, and indeed should not, mean mere copying, and least of all the sort of copying so unintelligently imputed to Mr. Cram by some of his critics. Authentic thought is more important, in the end, than mere pedantry. Mr. Cram, indeed, holds a brief for eclecticism when he says that a Renaissance reredos in a Gothic church would do no violence to his feelings, provided that it expressed something of the growth and evolution of the building. Mr. Cram reminded the writer that his firm regards the Gothic manner as having never died a natural death, but rather as having been supplanted violently by the spirit of the Reformation and by the works of the "pagan" Renaissance. Cram & Ferguson, Mr. Cram says, are carrying on with Gothic from the point at which it was unnaturally stopped, and with this vision of the style, they believe that its place is with living expressions, and that it is not to be regarded as merely archæological, and hence lifeless, but as a finely articulated architectural means of creating such buildings as St. George's School Chapel. Be the humanism of the Renaissance what it may in terms of architecture, there is no greater humanistic expression known that the intricate symbolism allowed by Gothic design, nor any means better suited to the incorporation of both historic and contemporaneous imagery in the very stones of the building.

St. George's School Chapel is not only an important addition to the distinguished achievements of Cram & Ferguson, but is, further, a monument to a perfect accord and unity in ideals and the working out of every detail as between the architects and John Nicholas Brown, the donor of the chapel. Throughout the work Mr. Brown was in close touch with the whole undertaking and unsparing of time, coöperation and enthusiasm. Closely associated, too, with the success of this building, was Chester Brown, of the office of Cram & Ferguson, upon whom rested that responsibility for details both major and minor to be appreciated only by the practicing architect.

With this survey and introduction to the building as a whole, there remains for study the detailed interest of its iconography, both without



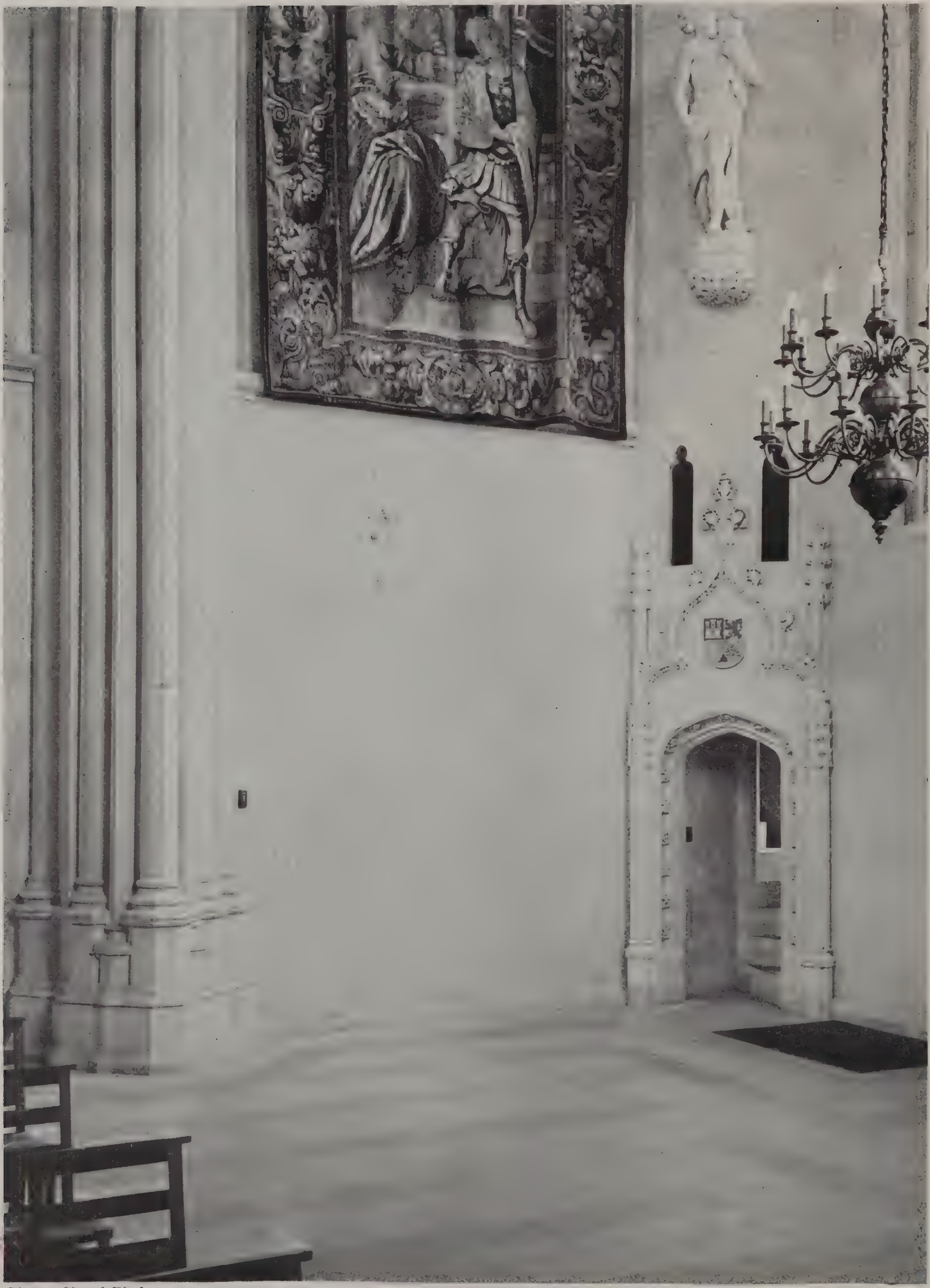
OSTON BLIC ARY

St. George's Chapel from the Quadrangle

and within. Let us suppose that we approach the chapel from the drive along its north side, where we may appreciate its frank and yet ingenious joining to the old school building. The brick-and-stone Tudor manner of this is recognized by the small polygonal turret, crenelated, with panels of brick and English flintwork combined with the stone of the chapel,—a transition far from abrupt, even without the aid of the ivy which will one day cover the walls of both. Between this small turret and the turret containing the tower stair there is a door opening into the ante-chapel and the old school building, a door surmounted by a figure of St. George and the dragon. The moulding stops are grotesque figures symbolizing school athletics,—football and baseball. Projecting from the top of the stair turret, which rises a little above the end of the transept, are six gargoyles, and beneath these, at the junction of the window label mouldings, are six heads, carved of stone, portraits of John Nicholas Brown, Messrs. Cabot, Nevins and Peaslee, of the school, and Ralph Adams Cram and Chester Brown, of Cram & Ferguson. The north transept window is surmounted by a figure of the Virgin and Child, in a niche, and the label moulding stops bear symbols of virginity,—the unicorn and the burning bush. The baptistry window is in the short east wall of the north transept, and its moulding stops are a sea horse and a shell. Above them is a water spout carved in the form of a school of dolphins, completing the symbolism, at this point, of the nearness of the chapel to the sea.

Above the ante-chapel rises the tower, a thoroughly fine and beautiful piece of design, recalling in its manner England's old Merton College. Those who favor casting all old precedent into the scrap heap in favor of something,—anything,—"modern," might be invited to look at this tower before they become too sweepingly radical. Its combined strength and grace, true to its style, will certainly successfully challenge the centuries, as, indeed, the Gothic towers of the middle ages have so far done by their sheer architectural excellence. This is a tower with a bell deck screened by open mullions and tracery, with pinnacles and pierced crenelation against the sky. Below the bell deck are shields of Connecticut, Jerusalem, Antioch, Alexandria, Rome, Constantinople, Canterbury and St. Andrew's. In the spandrels of the bell deck openings are carved figures to symbolize some of the liberal arts,—philosophy, music, astronomy, arithmetic, geometry, rhetoric, and grammar.

Returning, again, to the north elevation, there is the architects' door, a finely organized unit of design, with its delicate buttresses, its pierced

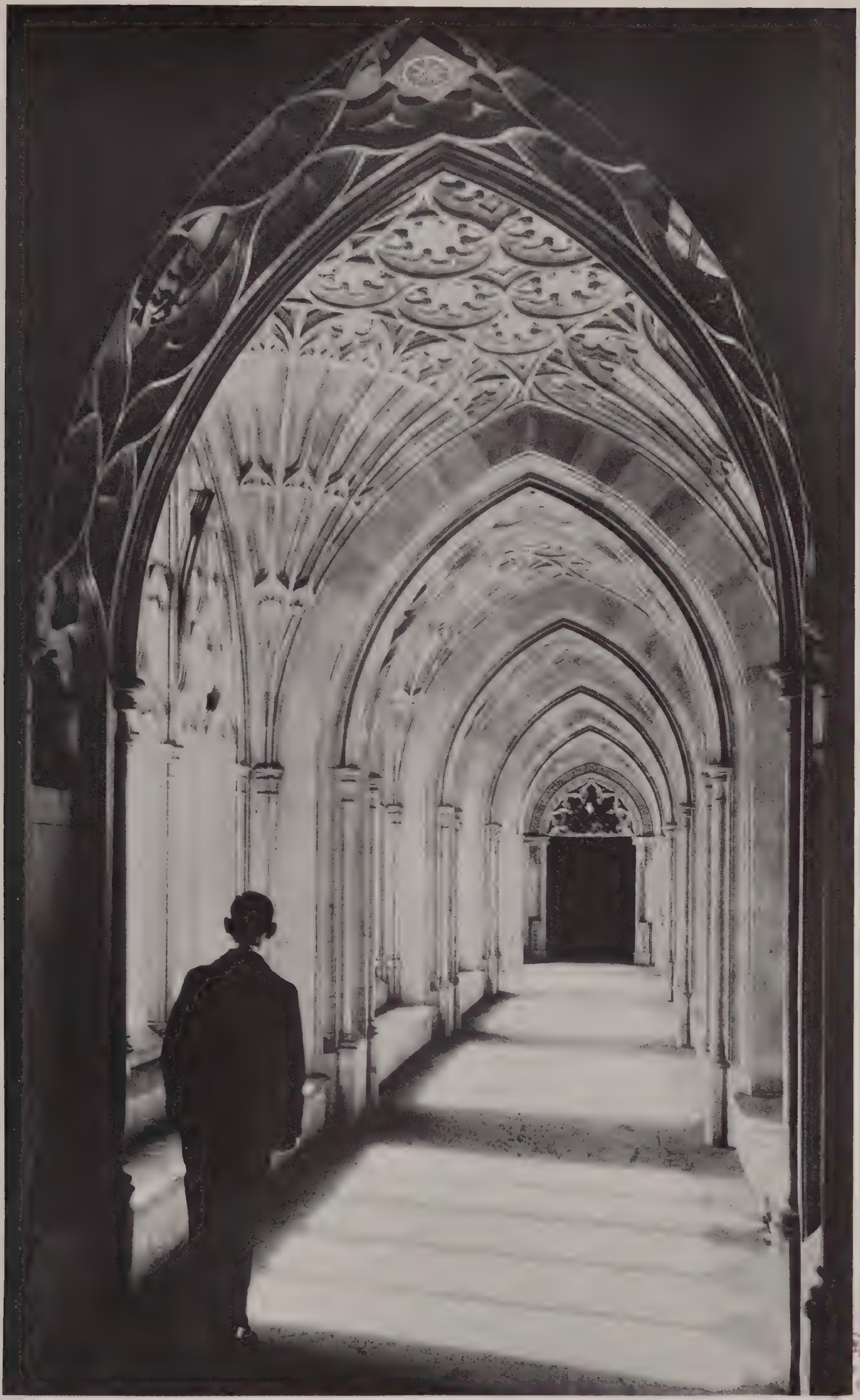


Photos. Sigurd Fischer

DOOR TO STAIR TURRET WITH FIGURE OF ST. CHRISTOPHER. JOSEPH COLETTI, SCULPTOR

CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT

CRAM & FERGUSON, ARCHITECTS



CLOISTER, LOOKING TOWARD DONOR'S DOORWAY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

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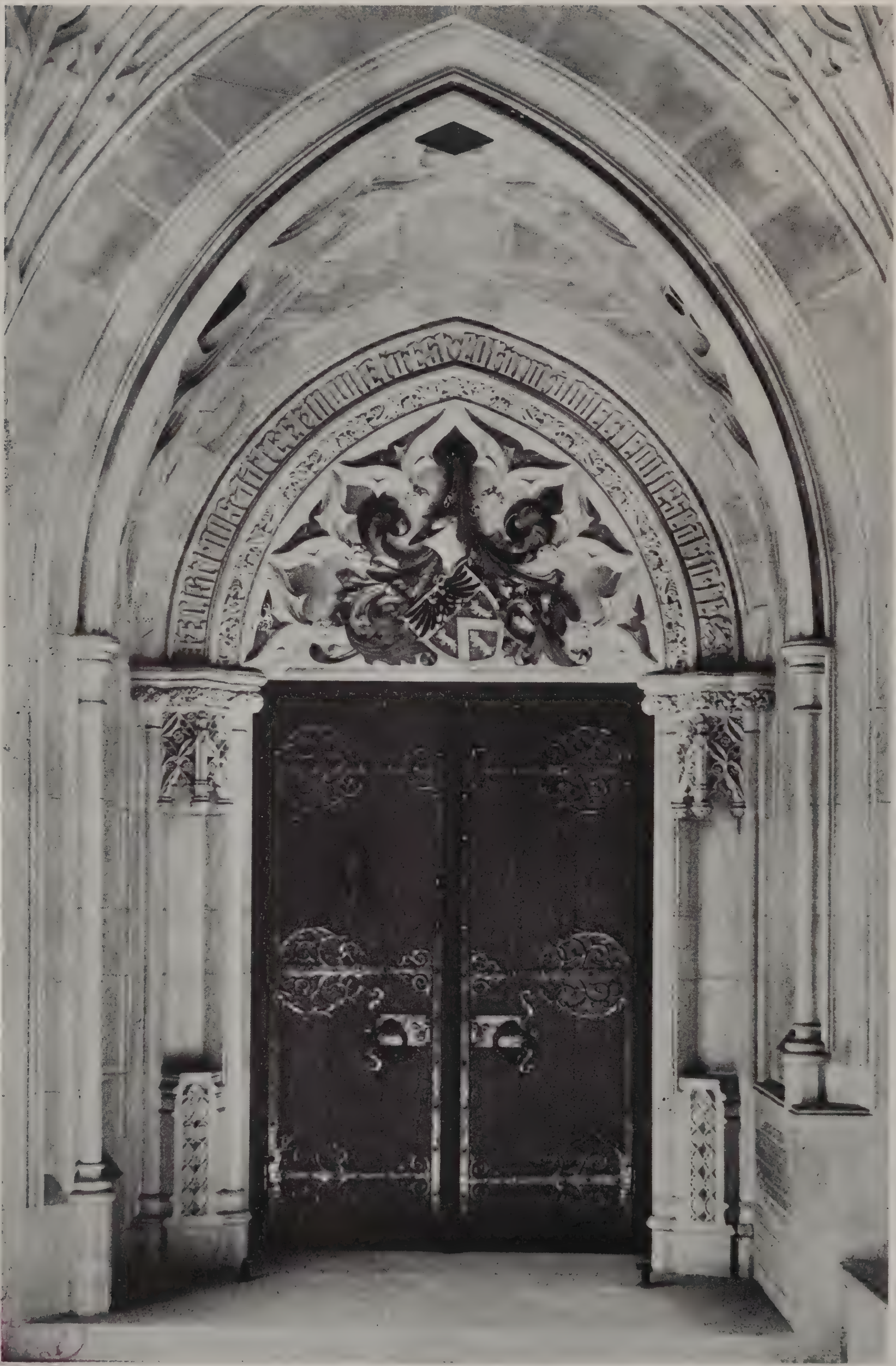
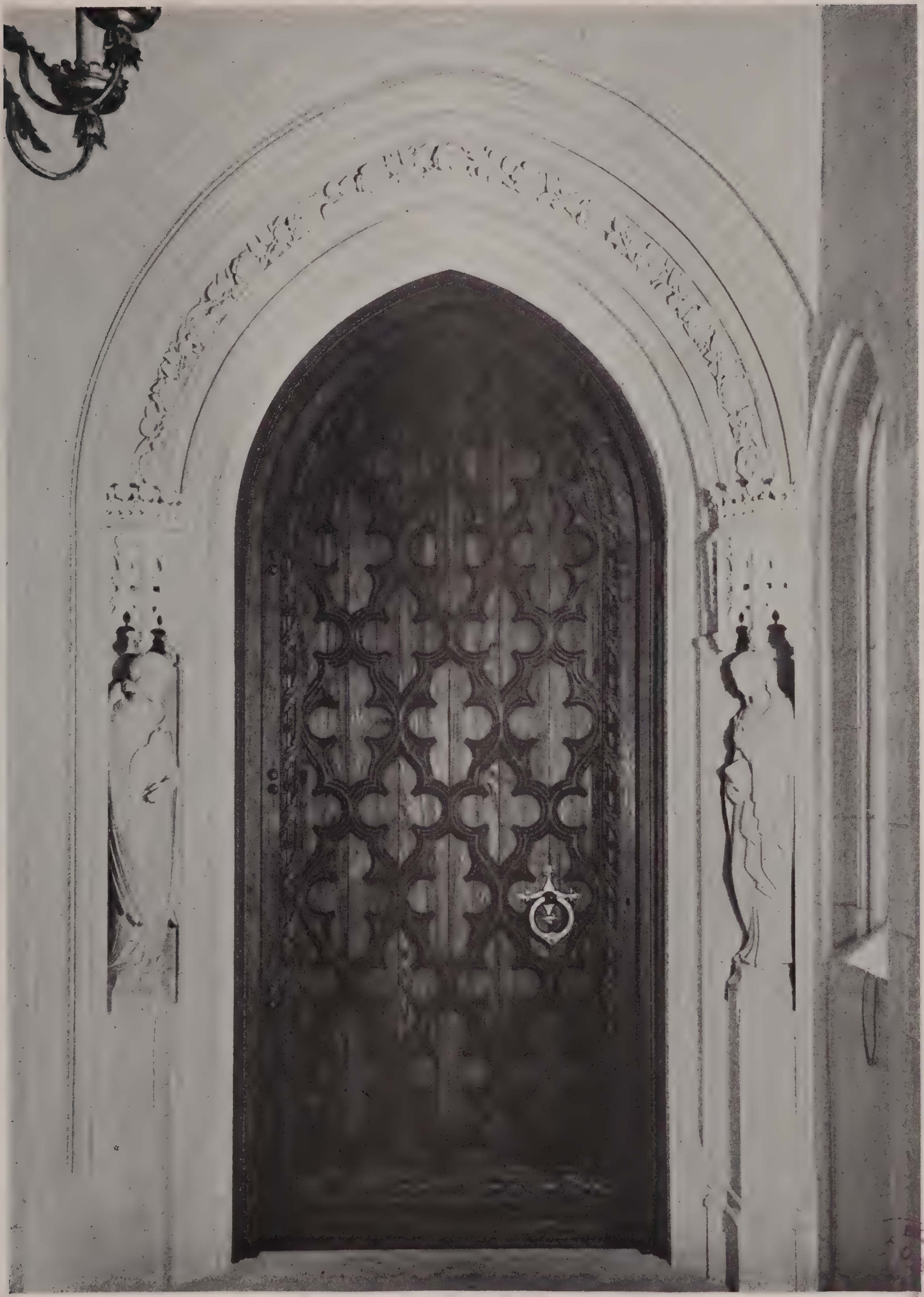


DONOR'S DOORWAY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



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DOORWAY TO LADY CHAPEL
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

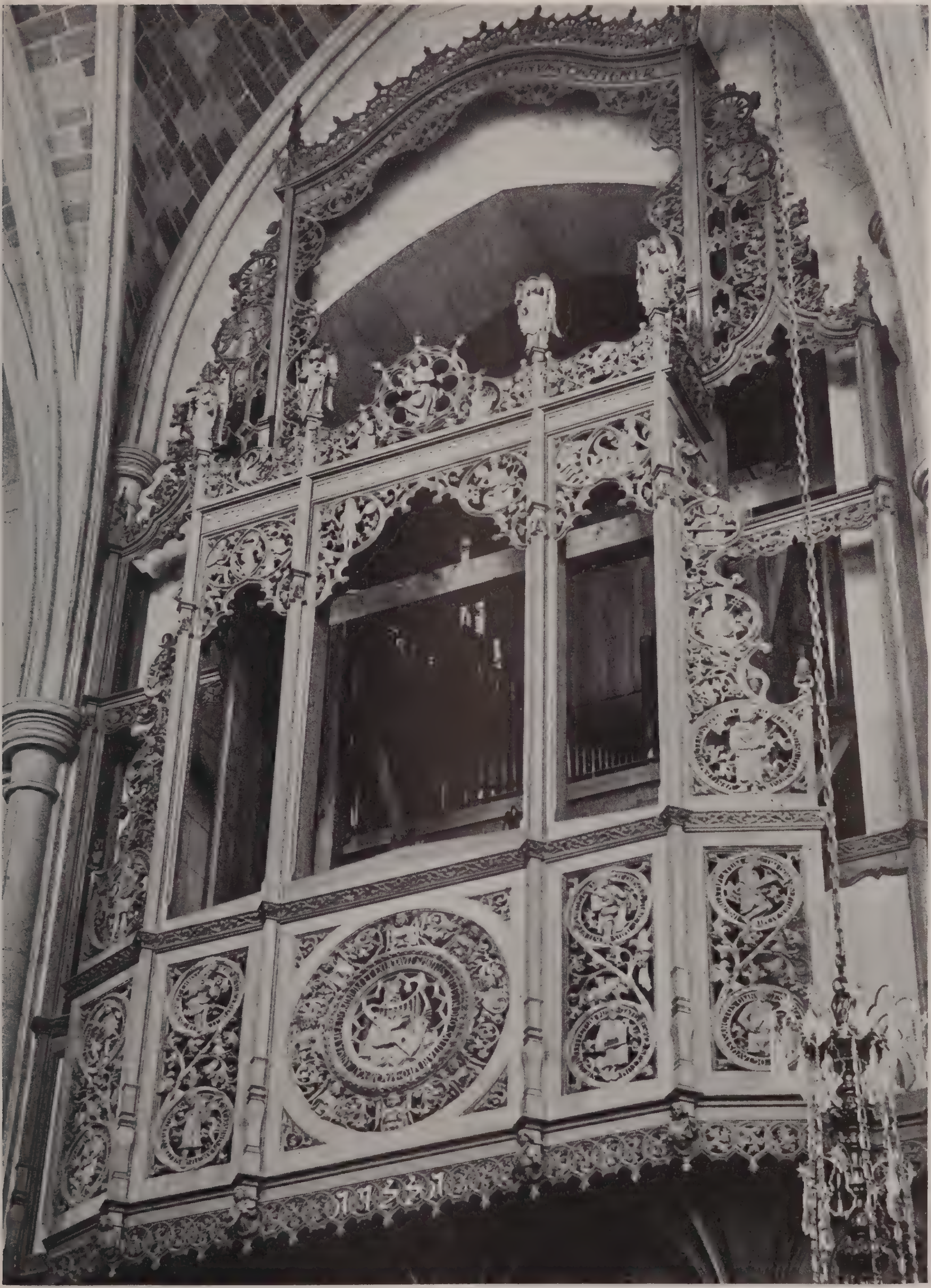
Entrance to Crypt

Within the Crypt

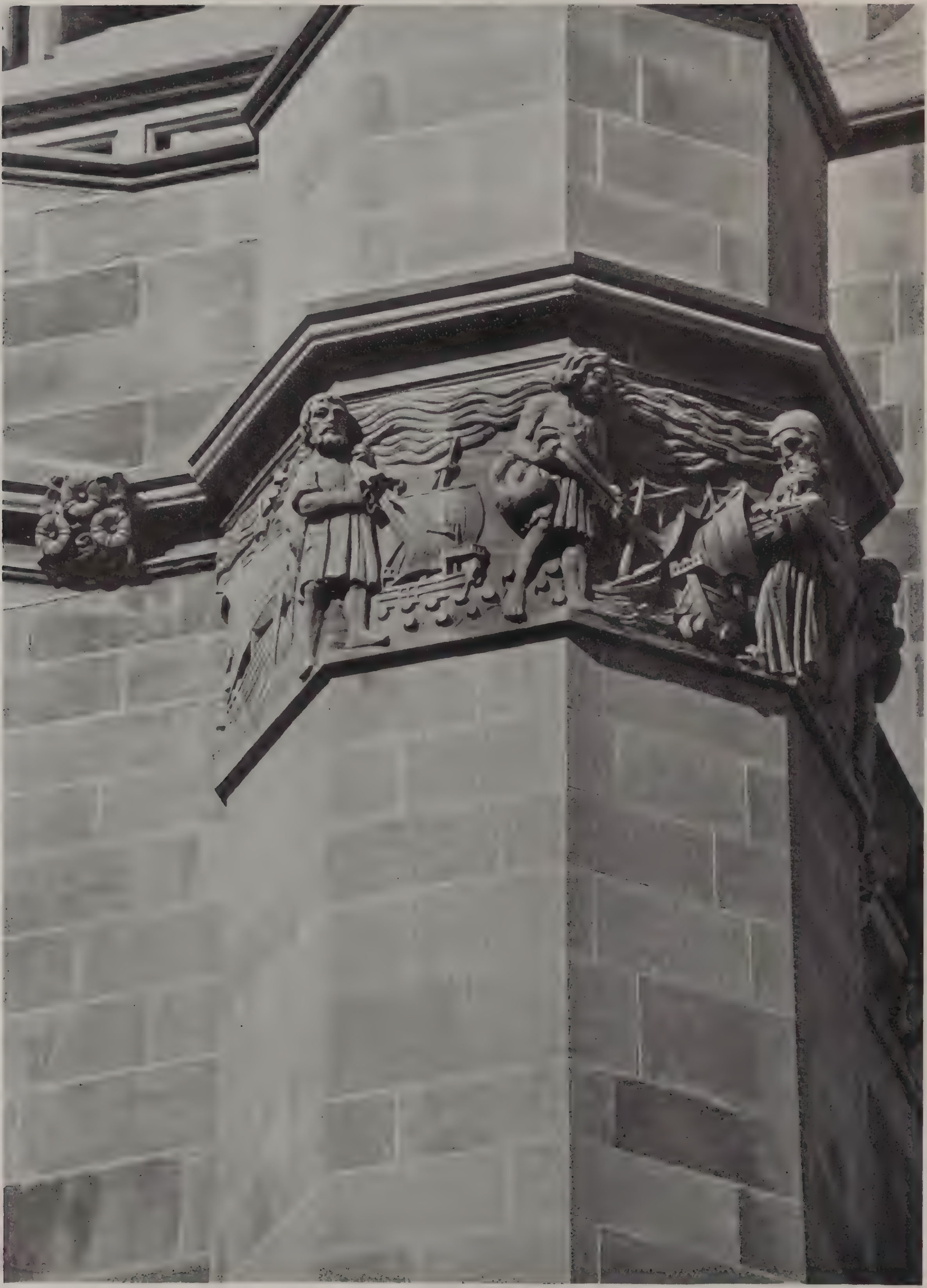
quatrefoil rail, and its slender pinnacles. Two gargoyles project below the rail, and surmounting the whole are two angels symbolizing the fame of architecture,—one is singing and one is trumpeting, and further symbolism is found in their instruments, one of three and one of four trumpets. "Three" is the symbol of the Trinity; "four" is the symbol of the evangelists, and three added to four typify the seven days of creation, while three multiplied by four gives the twelve apostles. On the lintel of the architects' door are the arms of Cram & Ferguson, flanking an inscription.

The remaining iconography on the north elevation is found in the bosses in the cornice moulding. Those on the north transept consist of symbolism of Our Lady,—star of the sea; lily; sun, moon and stars; rose; Queen of Heaven; crown of seven stars, seraphim; sealed book; and star. The cornice bosses along the choir-nave, just above the buttresses (as also on the south elevation), have to do with various historical events, amusements, slang phrases and so forth, popular at the time of building the chapel. Here, for instance, are discernible the crossword puzzle "bug," the "lounge lizard," the solar eclipse of 1925, and various other riddles for future archæologists to puzzle over. Church builders of the middle ages did the same thing, and architects of today miss a special opportunity to humanize their work when they fail to utilize the possibilities of the mediæval grotesque in recording contemporary history, types and mannerisms. The east elevation contains but three figures: Our Lord, in a central niche over the sanctuary window; and in the south pinnacle, St. Stephen, typifying the New Testament,—he was the protomartyr; in the north pinnacle, St. John the Baptist, symbolizing the Old Testament. He was the precursor of Our Lord. The south elevation has the carvings and the heraldry of the cloister, and an interesting symbolization of the four winds, modeled by Andrew Dreselly, as a crowning motif for a small turret at the east corner of the south transept. Virtually all the other sculpture within and without the chapel is the work of Joseph Coletti, of Boston, while Mr. Dreselly modeled most of the architectural ornament.

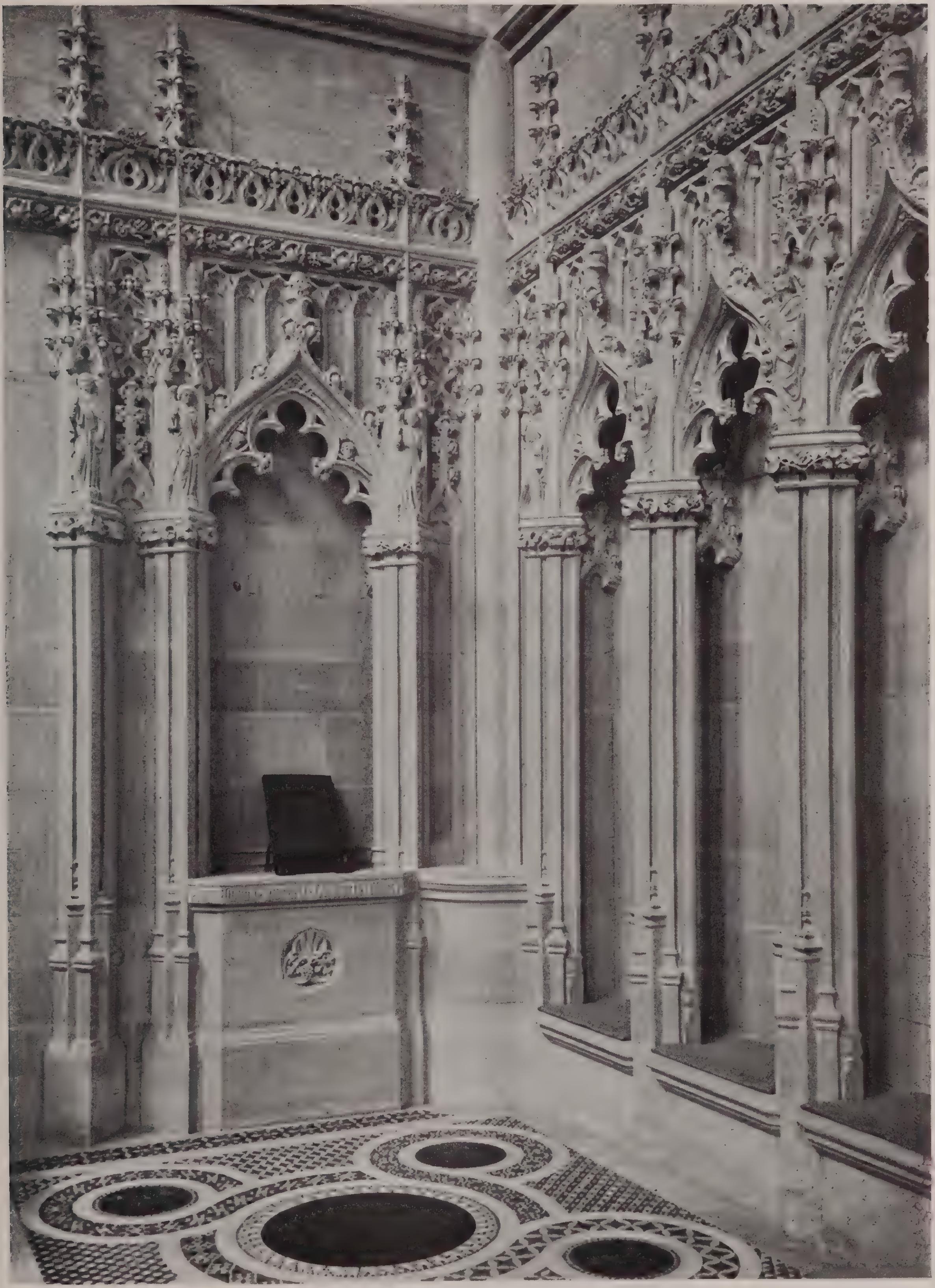
The exterior of the cloister displays the history of shipping in carvings at the junctions of the opening mouldings, beginning with the Santa Maria, and showing the Clermont, the Ann Hope and the Colorado. The cloister is fan-vaulted, with painted symbols of saints in the vaulting. The door at the west end of the cloister gives into the ante-chapel, and is known as the donor's door, the door at the east end gives into the statio, and on



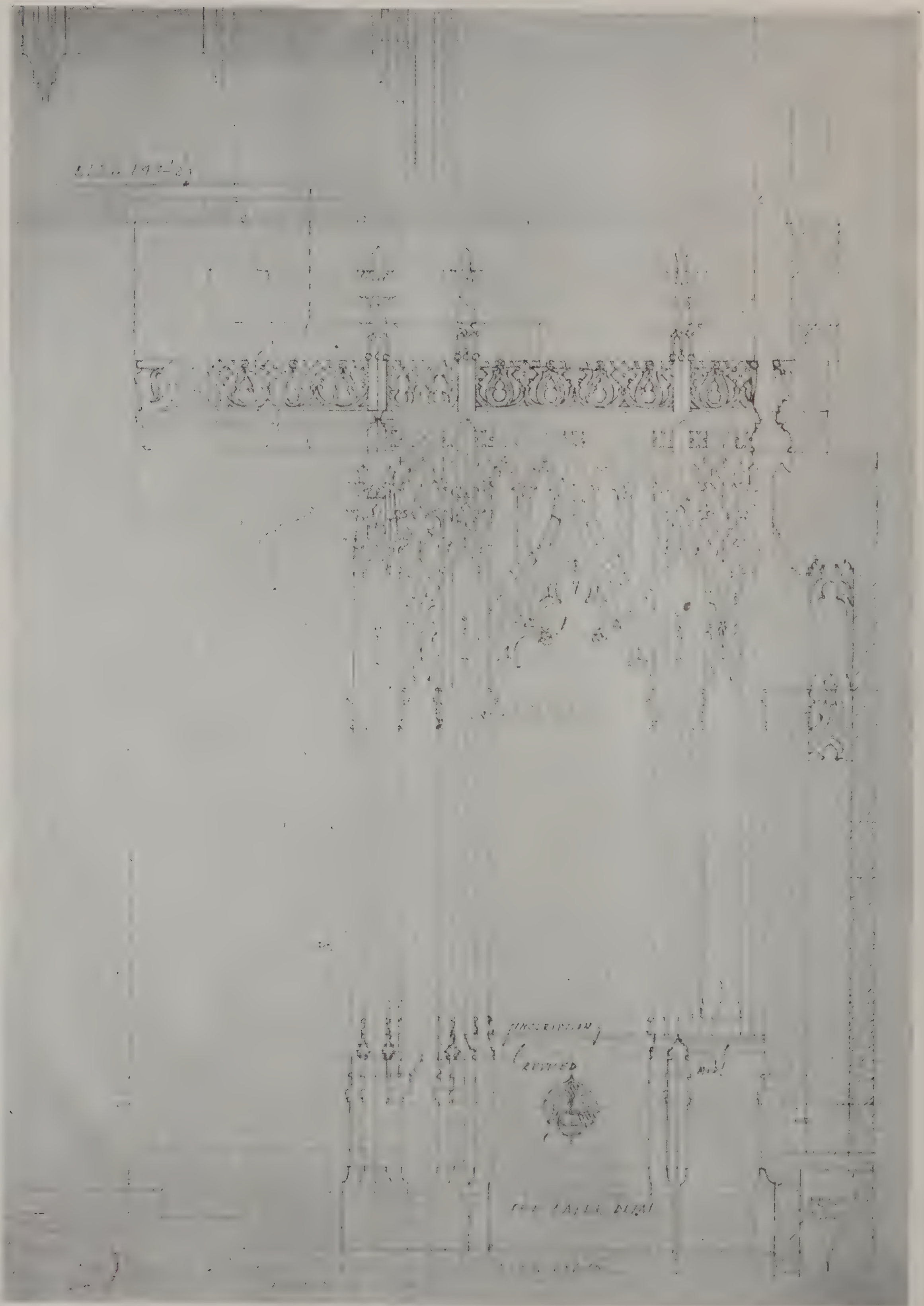
ORGAN CASE
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



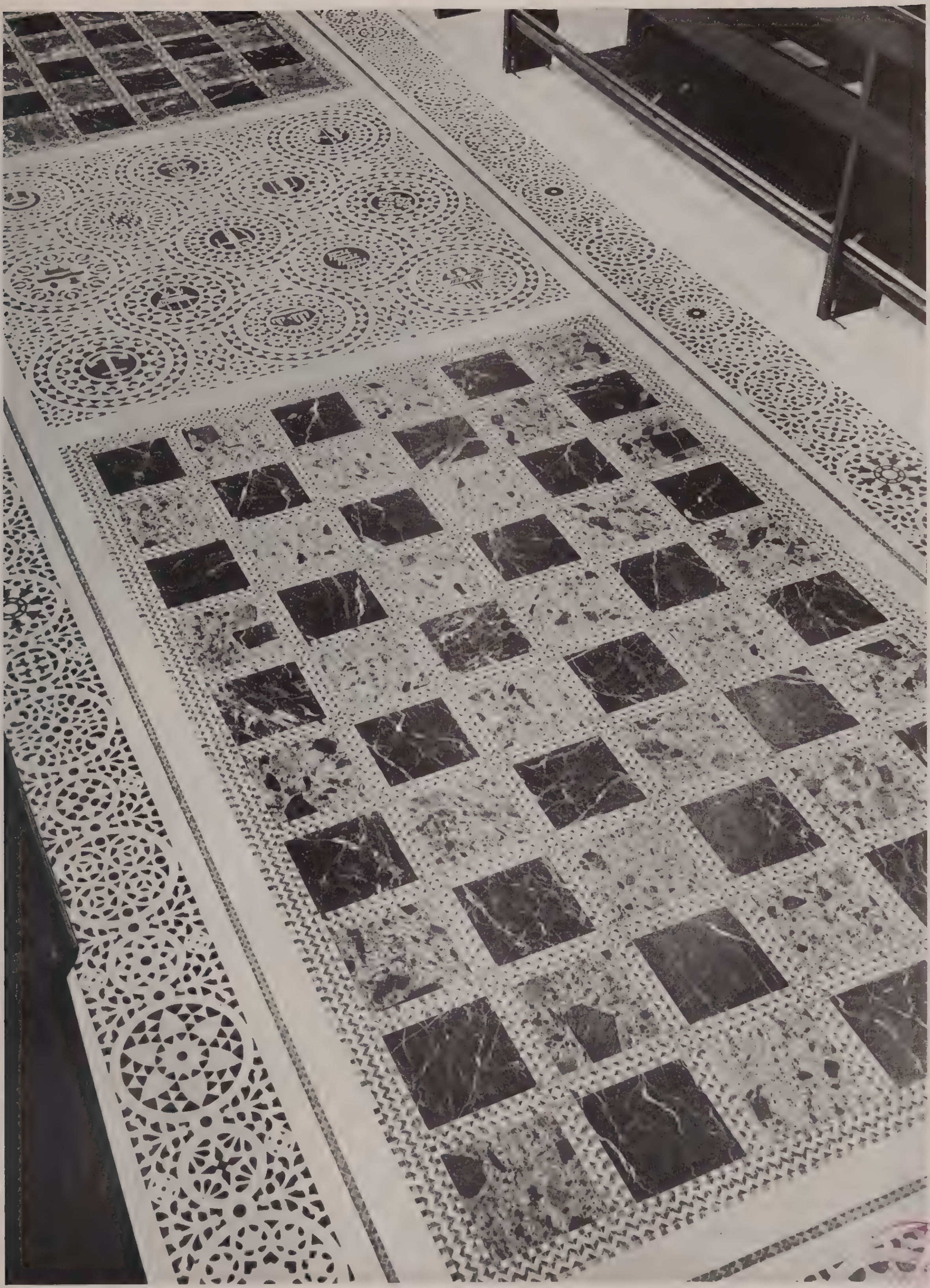
TURRET WITH FIGURES REPRESENTING THE WINDS. ANDREW DRESELLY, SCULPTOR
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



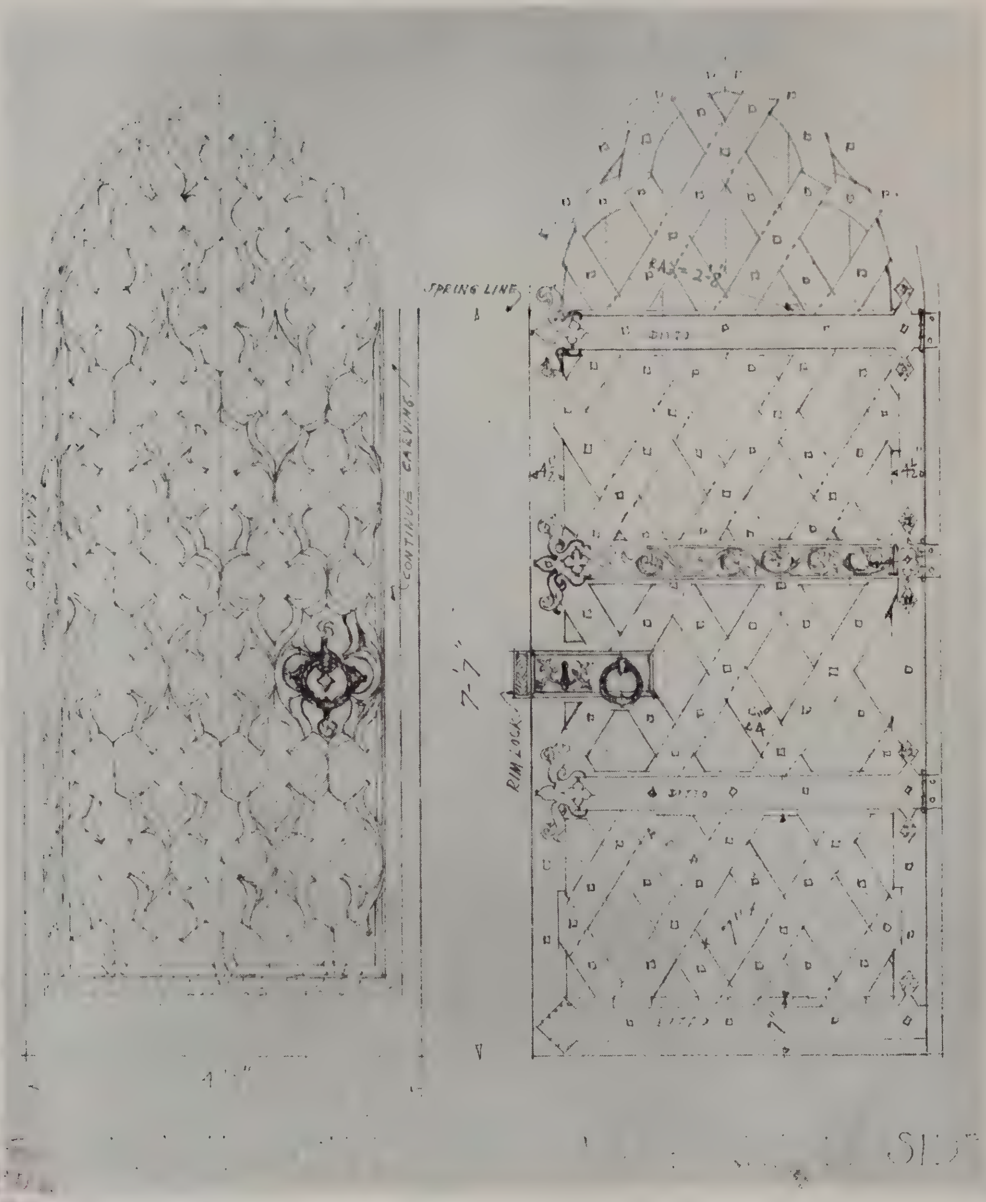
SEDILIA AND CREDENCE.
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



DETAIL, STONE SCREEN, EAST WALL OF SANCTUARY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

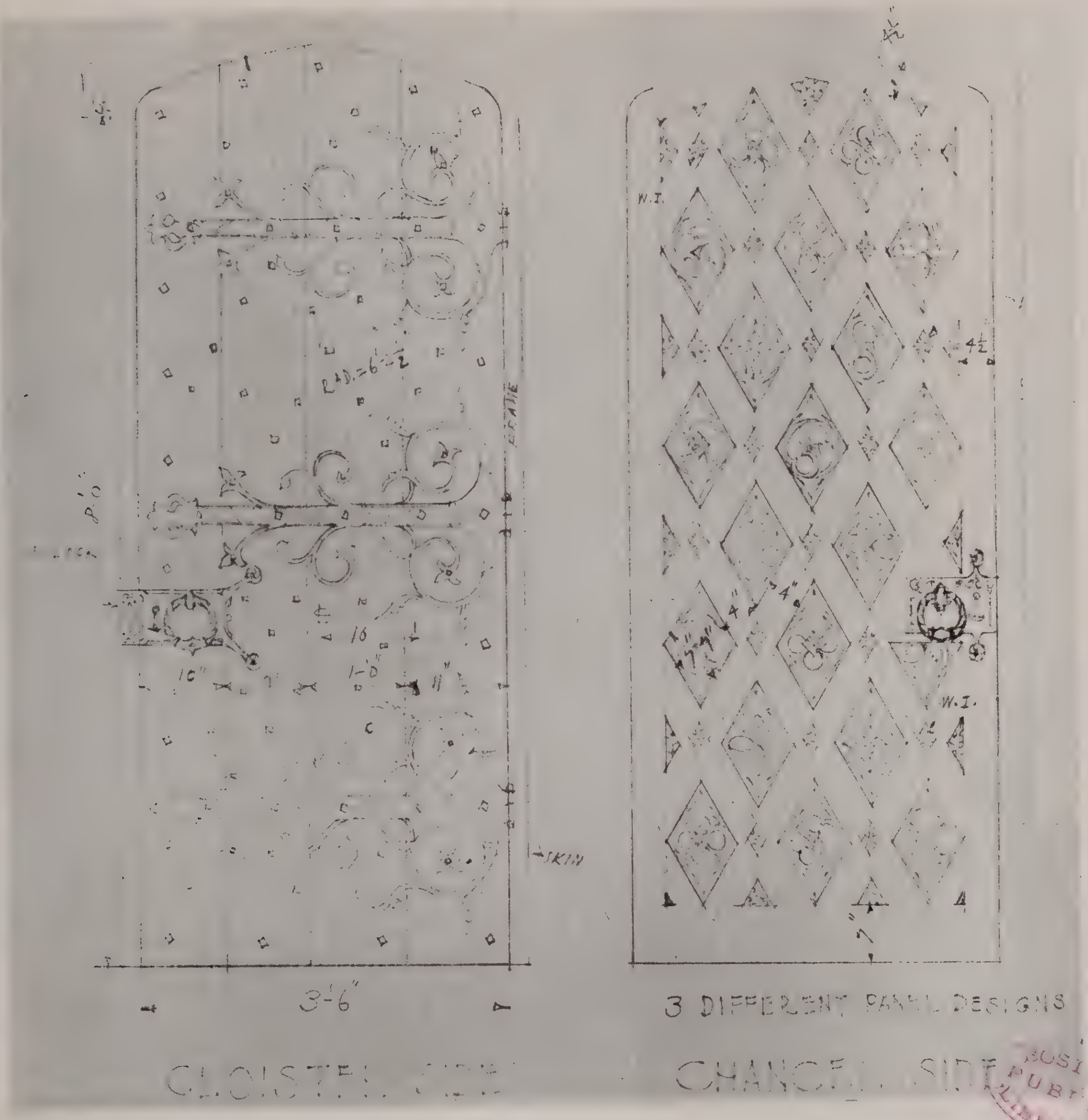


FLOOR BETWEEN CHOIR STALLS
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



Details, Door from Statio to Lady Chapel

either side are figures of the Angel Gabriel and the Virgin of the Annunciation. Similarly placed at left and right of the donor's door are St. John and St. Nicholas, with the family arms of the donor in rich polychrome in the spandrel above the door. Completing the heraldic symbolism at this point, the colored shields and lozenge in the ceiling vaulting at this end of the cloister are those of St. John, St. Natalie and St. Nicholas. The donor's door, made of teak, with splendid hinges and mounts, is intricately carved on the inside,—the doors throughout, indeed, being each an unusually fine piece of design, with wrought ironwork by Samuel Yellin, of Philadelphia. Standing, now, in the ante-chapel, further symbolism offers itself for study. To the left, on entering from the cloister, through the donor's door, there is the south door, above which there is a carved representation of St. George with the dragon, above which, again, are the carved and painted coat of arms of the Bishop of Rhode Island, impaled with the arms of the Diocese of Rhode Island. High aloft, at the intersection of the ribs of the ante-chapel vaulting, is a large boss of St. George slaying the dragon, surrounded by a ring of wingless angels bringing heavenly aid. This is brilliantly painted in red and blue and white and gold, and the vaulting also has four other carved bosses, unpainted. These represent the palms of victory and cross of gold, the peacocks that symbolize immortality, the birds and grapevine, symbolic of St. George's conversion,



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Details, Door from Cloister to Chancel

and the fauna that symbolizes creation. The maze in the ante-chapel floor represents the difficulties of the Christian life as encountered in the progress toward the Resurrection as symbolized by the phœnix at the center.

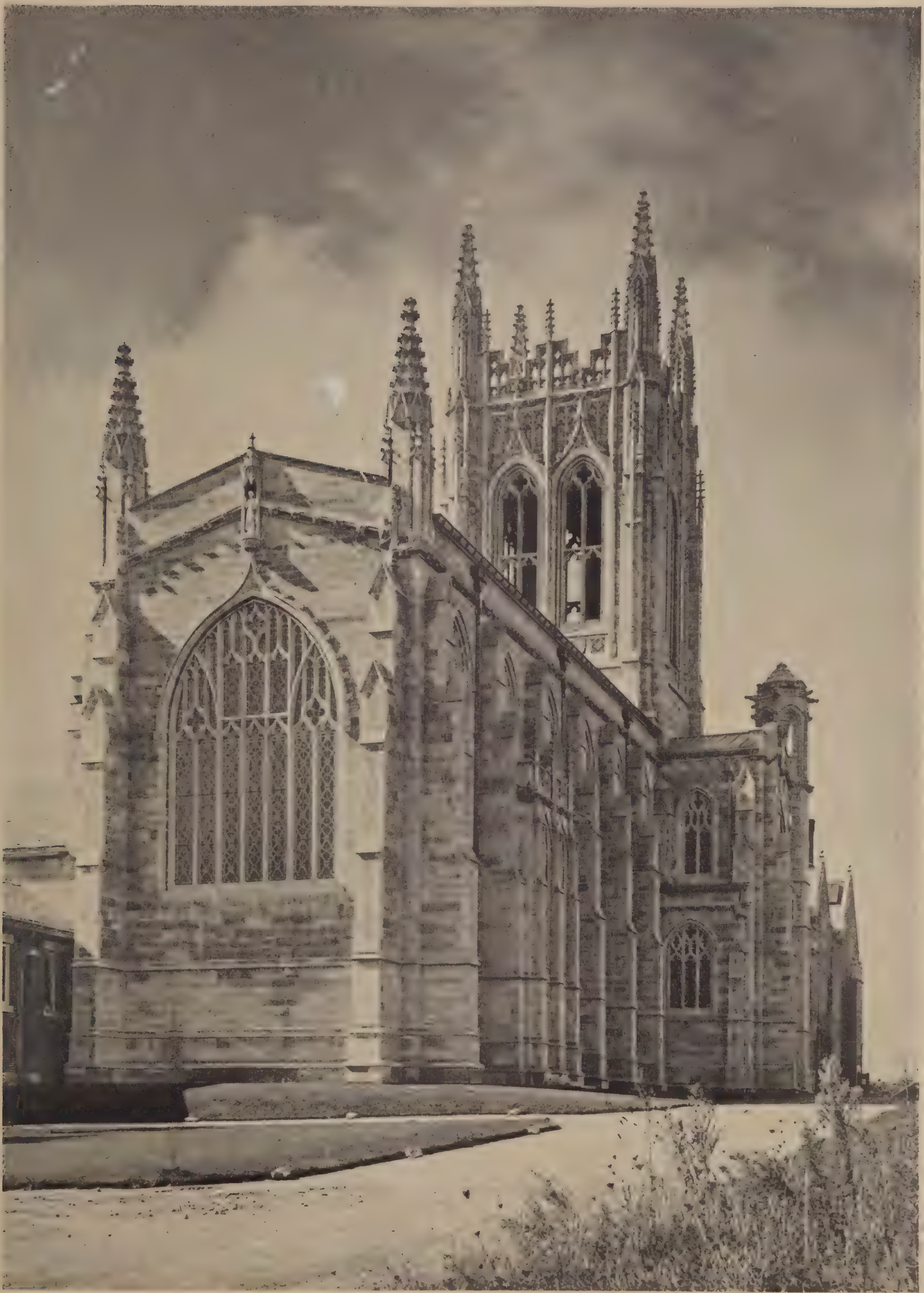
The space now covered by a tapestry on the west wall of the ante-chapel will at some future time contain an open balcony. In the northwest corner is the door to the circular stairway which leads up to the bell deck of the tower,—a doorway not only treated in the Spanish manner of Gothic, but with a painted carving of the arms of Columbus above it. Future historians may find in this a record of Mr. Cram's recent journeyings in Spain, or simply historical symbolization of the land in which the chapel is built. The Spanish motif, however, carries further, for the end of the central core of the circular staircase, at the very top, terminates in a grotesque finial figure of Don Quixote,—symbol of chivalry, if one insists on symbols, but better seen, perhaps, as one of those quaint and enigmatical surprises in which the Gothic buildings of Europe delightfully abound. Above the colored arms of Columbus a figure of St. Christopher stands out from the wall on a corbel. The northeast corner of the ante-chapel will be the baptistry when it is completed, and there will be an elaborate screen separating the ante-chapel from the choir-nave.

There are stories in the mosaic floor, which is divided into three squares. The first of these (that at the west end) contains nine circles, with coats of arms of the countries of the Old World whence came the first colonists to the New,—Genoa included, as a tribute to Columbus. There are eight: Ireland, England, Scotland, France, Holland, Spain, Genoa and Prussia, with the arms of the United States at the center. The next square contains the signs of the zodiac, surrounding the sun, with Atlas in each of the four corners. The third square contains 13 circles with the arms of the original states of the union. In the corners of the floor space, at either end of the whole, are animal symbols of the points of the compass: N., a polar bear; E., a moose; S., an armadillo; and W., a buffalo. N.E., a codfish; S.E., an alligator; S.W., a prairie dog; and N.W., an eagle. The floor is laid in marble mosaic, distinctly Romanesque, or even Roman in manner and therefore puzzling to those who see in Gothic only a rigidly stylized articulation of strictly appropriate forms. The truth of the matter is that many a Gothic church in Europe contains work of various subsequent, or earlier periods, and that an *opus Alexandrinum* floor was brought from Rome to Westminster Abbey by Abbot Ware, in the fourteenth century. Thus also with the crystal chandeliers, which seem to some people less appropriate in a Gothic church than some contrivance of wrought iron hoops and massive chains. The architects' eclecticism, however, is supported here by ample precedent throughout France. Specifically, for those who would be specific, the Abbaye aux Hommes,—St. Etienne, at Caen.

As was mentioned in writing of the plan, what would ordinarily be the nave must also, in a school chapel, partake of the nature of what would otherwise be the choir. Fine, simple, rib vaulting carries throughout. In the sanctuary there will eventually be a reredos and altar in keeping with the carved stonework of the walls. The intricate organ screen is rich in its iconography, with four pierced medallions, two at the right and two at the left. These represent the Creation, Nativity, Crucifixion and the Second Coming. The carved wood inverted cresting carries the word "Alleluya" in Hebrew, done in gold characters, and above this are the eight modes of music. The large circular motif in the center above these shows King David, and about him are St. John, St. Cecilia, St. Ambrose, and St. Gregory, Guido d'Arezzo, and Boethius. Above these figures, and below the inscription *Te Aeternum Patrem Omnis Terra Veneratur* are Orpheus, Ptolemy, Pythagoras and Arion with the dolphin. Surmounting the inscription there are small circles in which appear the swan, Euterpe, Polyhymnia and the nightingale, at the left and the right of a central motif of Apollo. This lower cresting is set off from the portion above by four carved finials of the archangels, Uriel, Gabriel, Michael and Raphael. Above these, and to the left, is an angel blowing a trumpet; to the right is an angel playing a stringed instrument, and surmounting the whole intricate composition the inscription *Te Deum Laudamus Te Dominum Confitemur* in the uppermost cresting. Certainly a piece of work in which design and craftsmanship combine to effect a thing unusually fine. At the right of the sanctuary a door opens into the statio, which gives access to the lady chapel (the old school chapel), to the sacristy, to the door from the east end of the cloister, and to the stairs to the crypt.

Some of the most interesting carving in the chapel is found here, in column capitals suggesting Romanesque as much as Gothic. The outer columns at the sides of the crypt door show symbols of the Incarnation,—Shadrach, Meshach and Abednego in the fiery furnace, and Daniel in the lion's den. Here, also, the story from the Apocrypha, in which the angel grasps the prophet Habakkuk by the hair of his head. The inner column capitals by the entrance door have to do with symbols of the Resurrection, showing Jonah and the whale, and Jonah entering the city of Nineveh. From mediæval mythology there is the symbol of the lion and cub, in which a male lion breathes life into the cub three days after it has been born dead. Last of all, there is the capital of the central column in the crypt, showing the four rivers of paradise,—Gihon, Tigris, Euphrates and Pison. The thought here is that these four rivers foreshadow the four evangelists, who poured forth, like rivers, their inspiration to the world. At the four corners are fruits of paradise. St. Matthew, associated with the river Gihon, wrote for the Hebrews, hence the Hebrew inscription for the river; St. Mark, with the river Tigris, wrote for Greeks, hence the Greek inscription; and St. John, with the river Pison, was the herald of all.

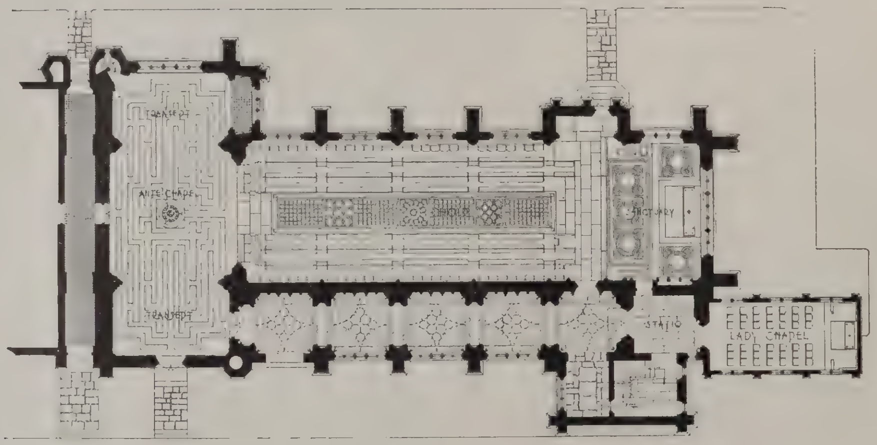
Three years in the building, and dedicated April 23, 1928, we see this beautifully designed and carefully articulated chapel building in all its newness, even yet not complete, and not yet with any of that charm that the patine of age lays with gentle hands upon even the least consequential building of antiquity. Yet, for all this, we see a highly and finely finished work. The St. George's School Chapel is distinguished architecture, which cannot be said of too long a list of recent buildings in this country, or, for that matter, in Europe. Although we do not in too many instances seem to regard them, we have architectural standards in this country. This firm, past and present, is one of the associations of architects which has done its share in establishing and maintaining through several decades these standards by work as definitely stylized, and at the same time as definitely personal as St. George's School Chapel.



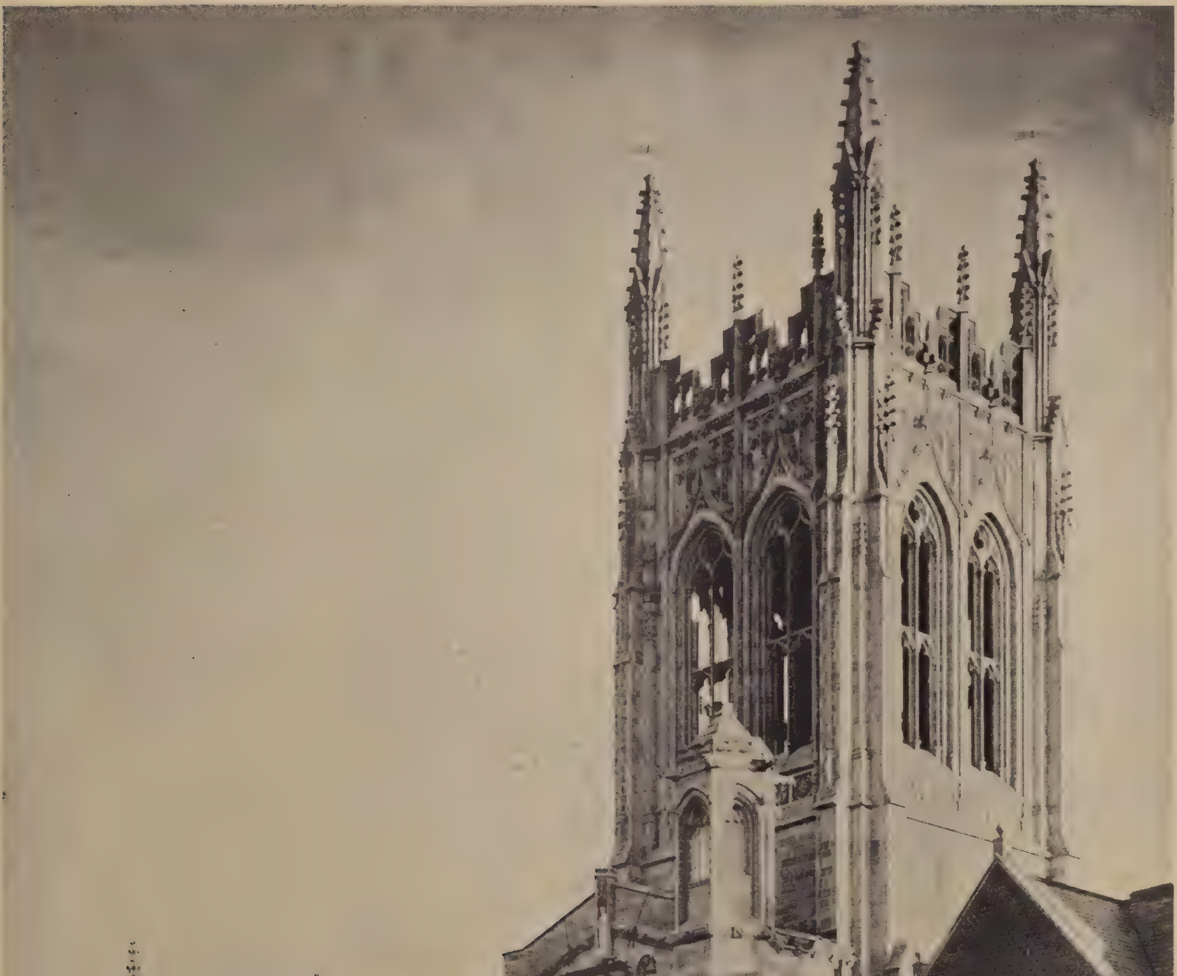
Photos. Sigurd Fischer

Plan on Back

CHAPEL, ST. GEORGE'S SCHOOL NEWPORT
CRAM & FERGUSON, ARCHITECTS

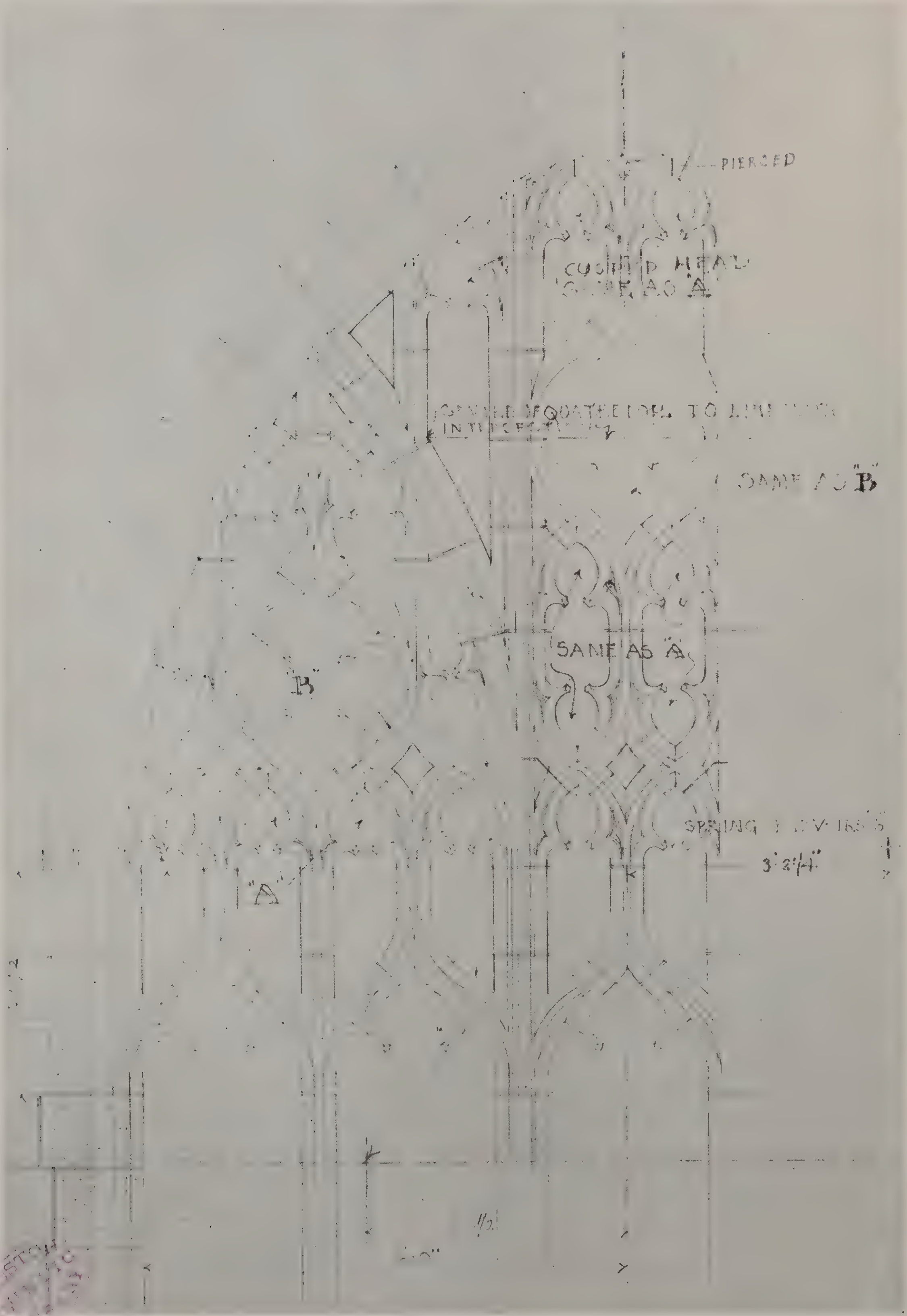


PLAN. CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

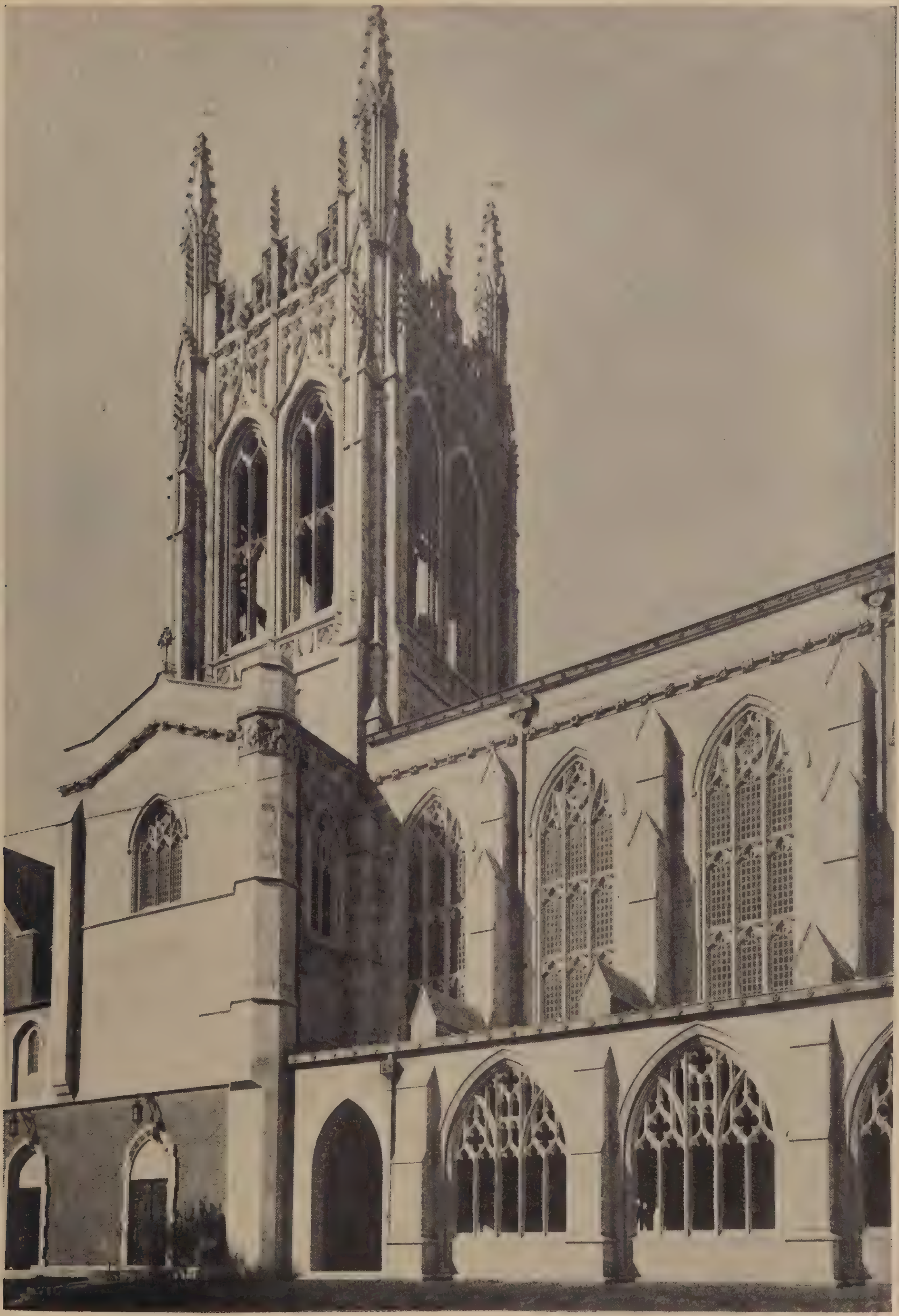


Detail on Back

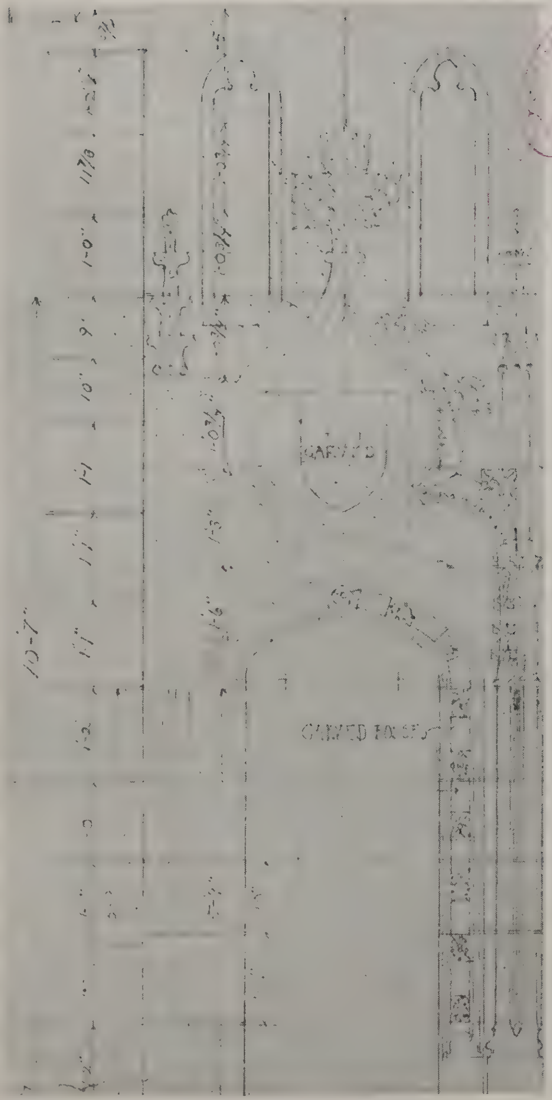
VIEW FROM NORTHWEST
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



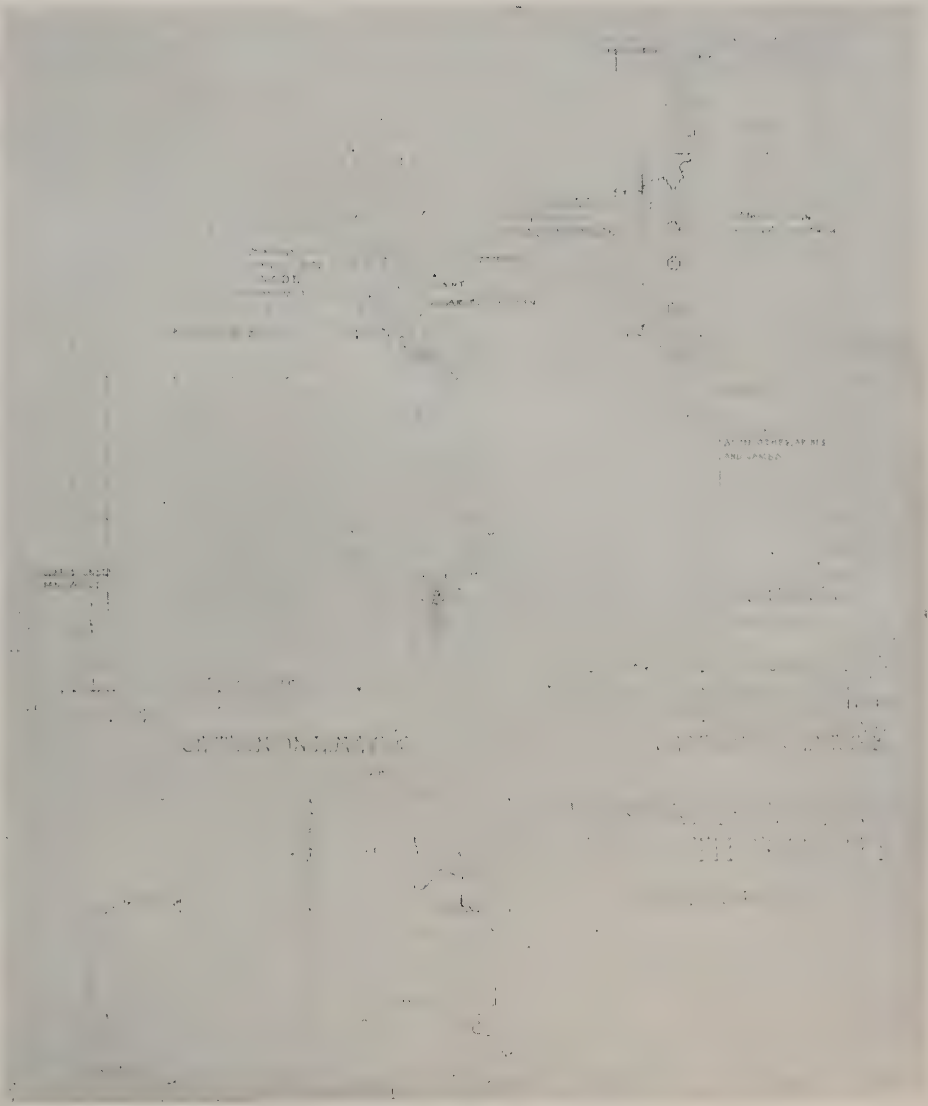
DETAIL, UPPER PART OF NORTH TRANSEPT WINDOW
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



TOWER, SOUTH TRANSEPT AND CLOISTER FROM SOUTHEAST
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

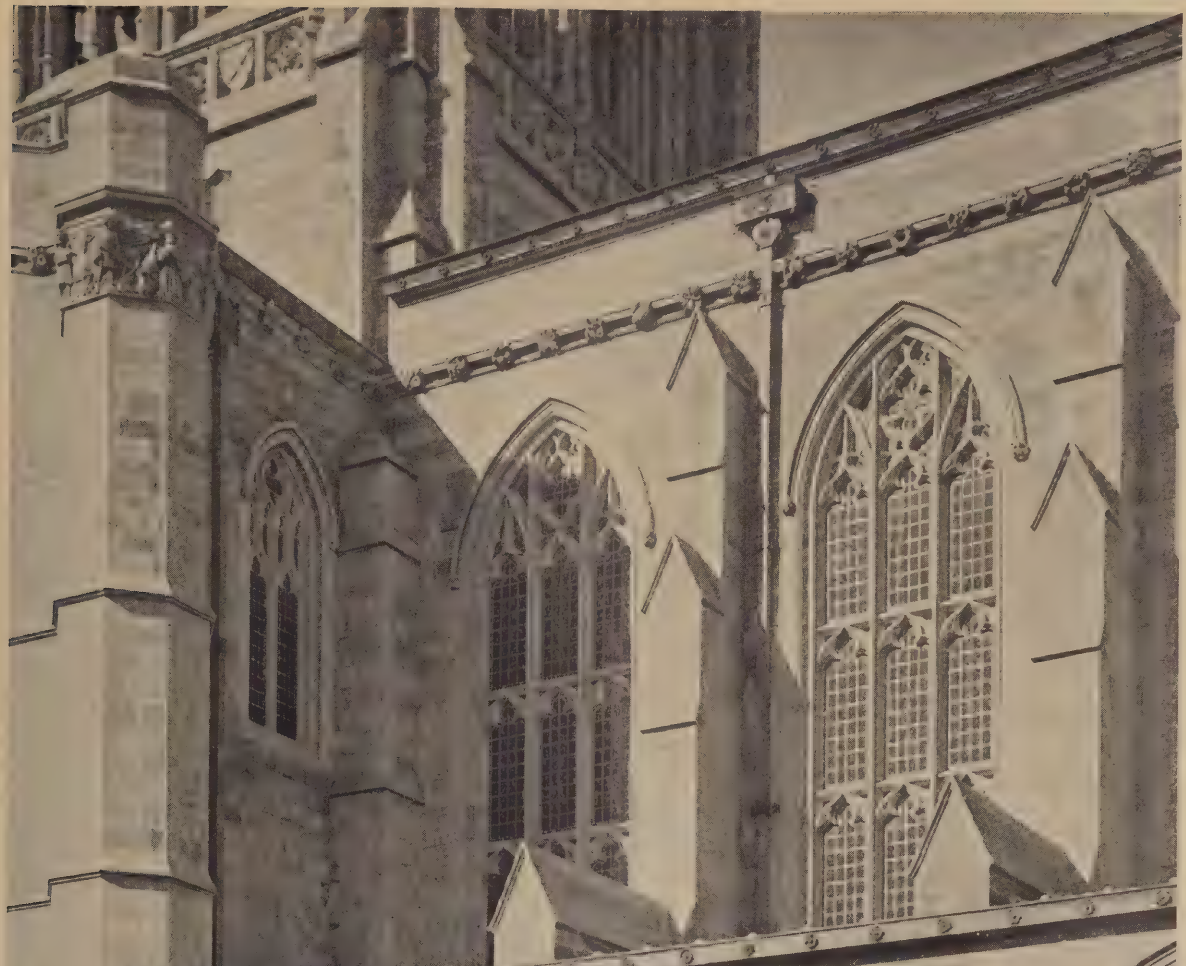


DETAIL OF A DOORWAY



DETAIL, DONOR'S DOORWAY

CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

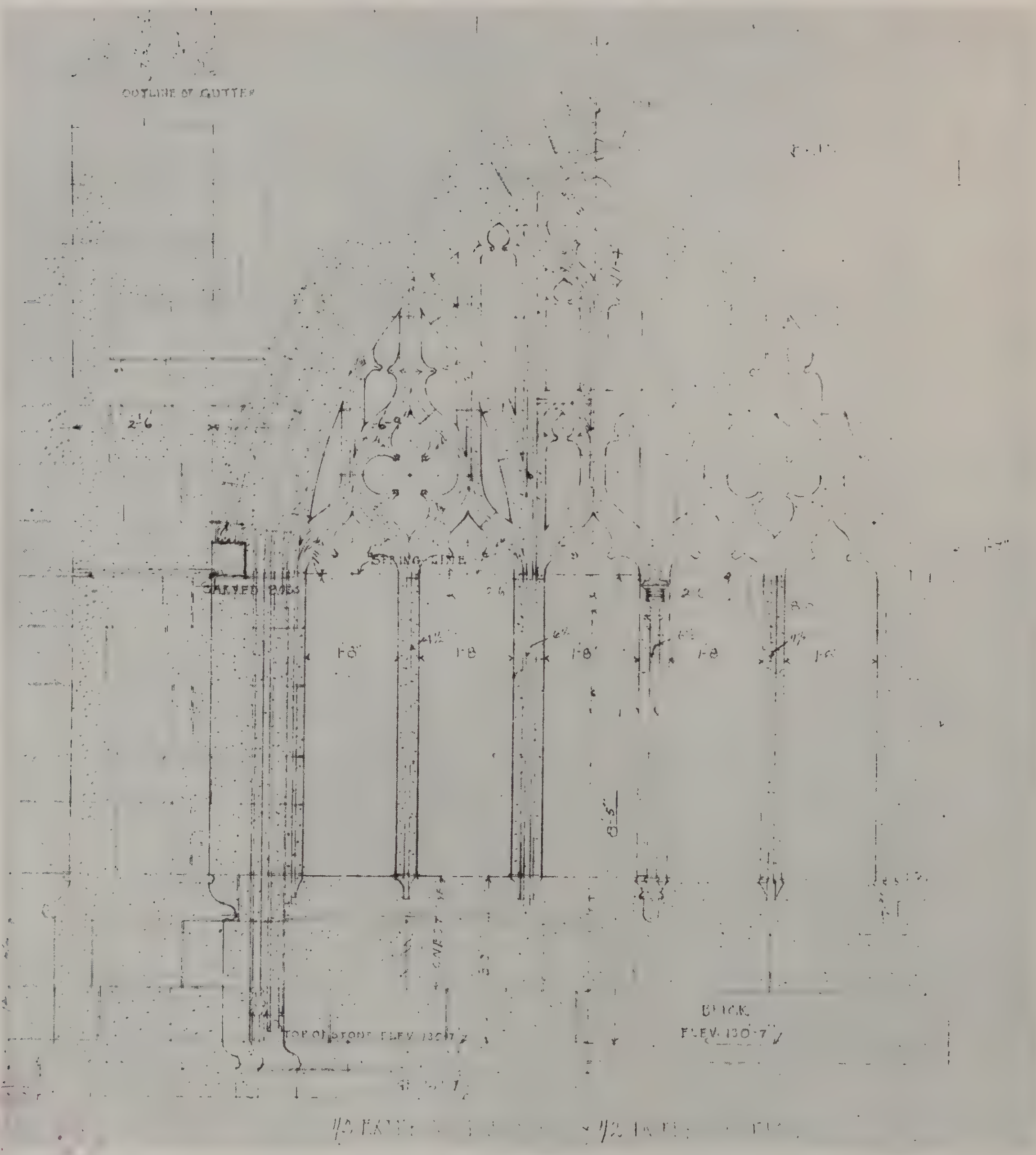


Detail on Back

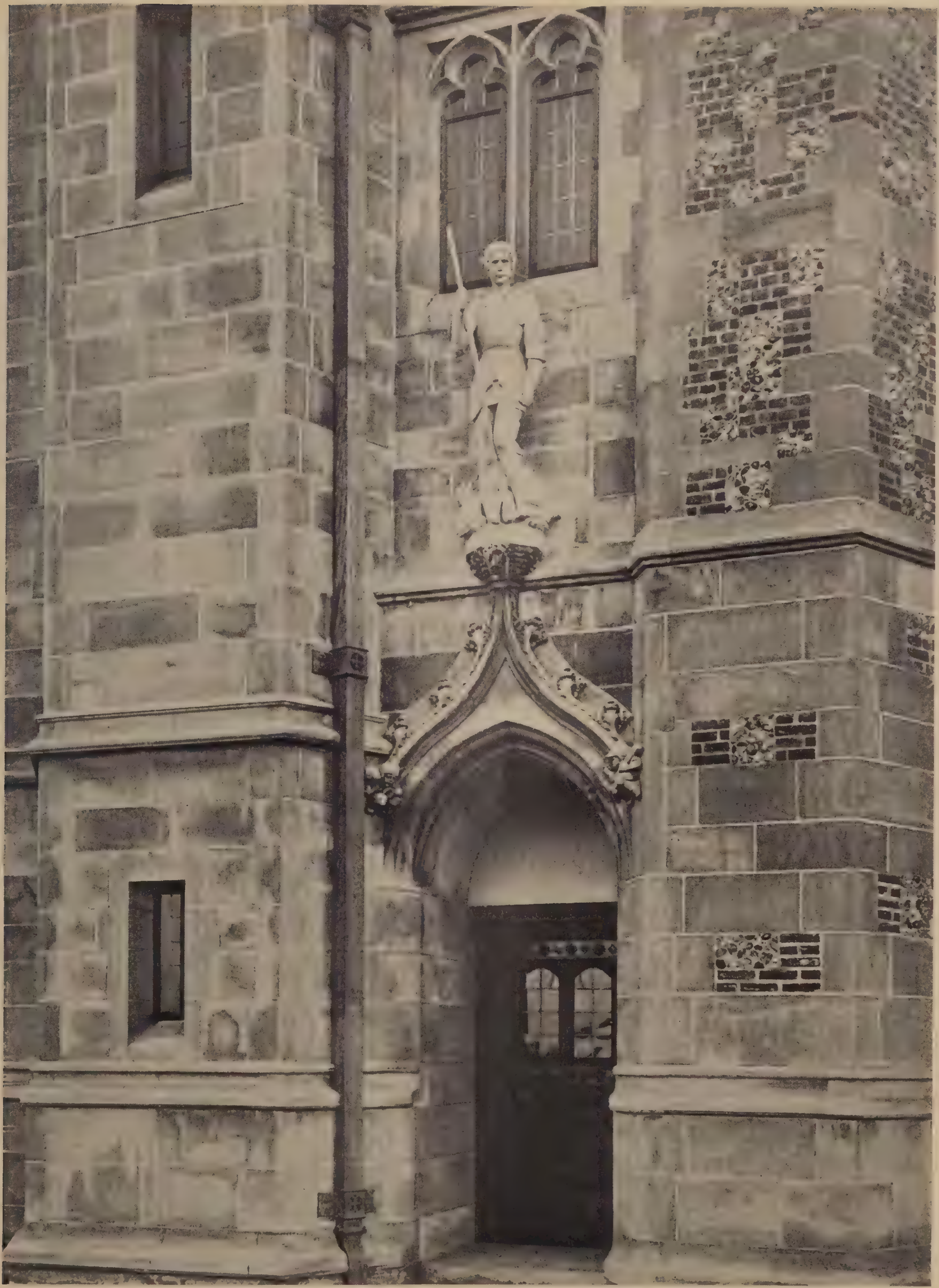
CLOISTER

CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT

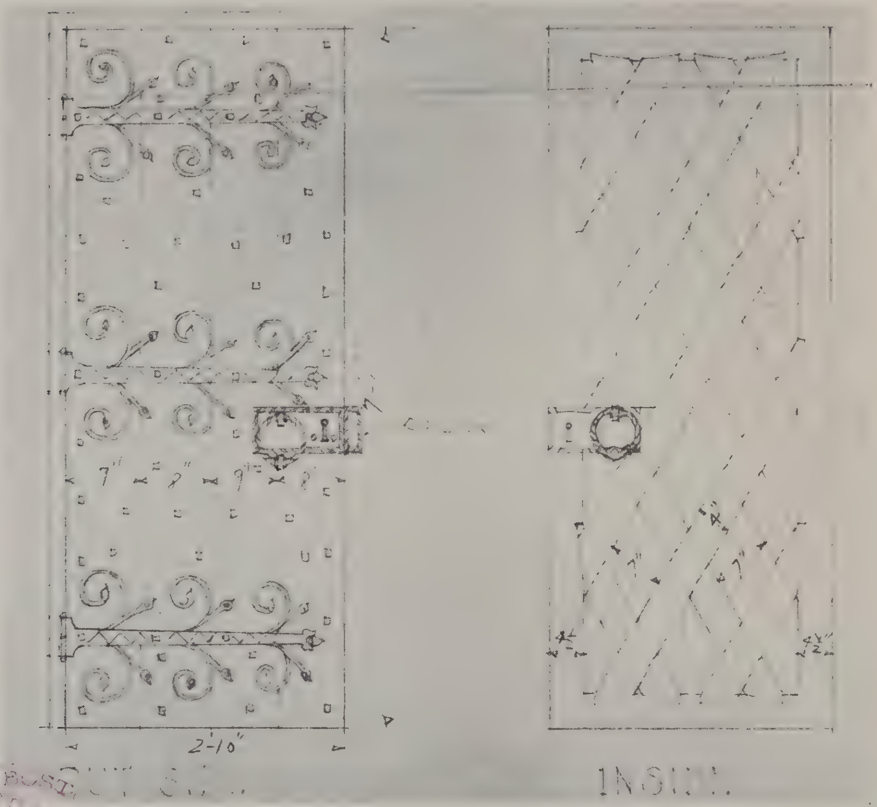
CRAM & FERGUSON, ARCHITECTS



DETAIL, CLOISTER TRACERY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



ST. GEORGE'S DOORWAY, FIGURE OF ST. GEORGE BY JOSEPH COLETTI, SCULPTOR
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



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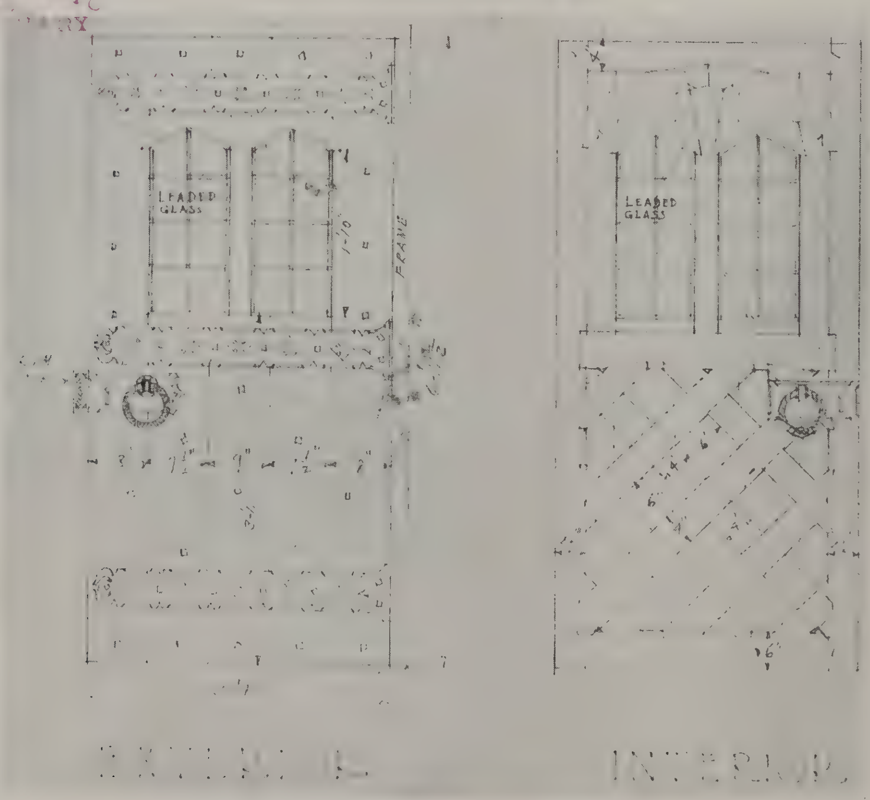
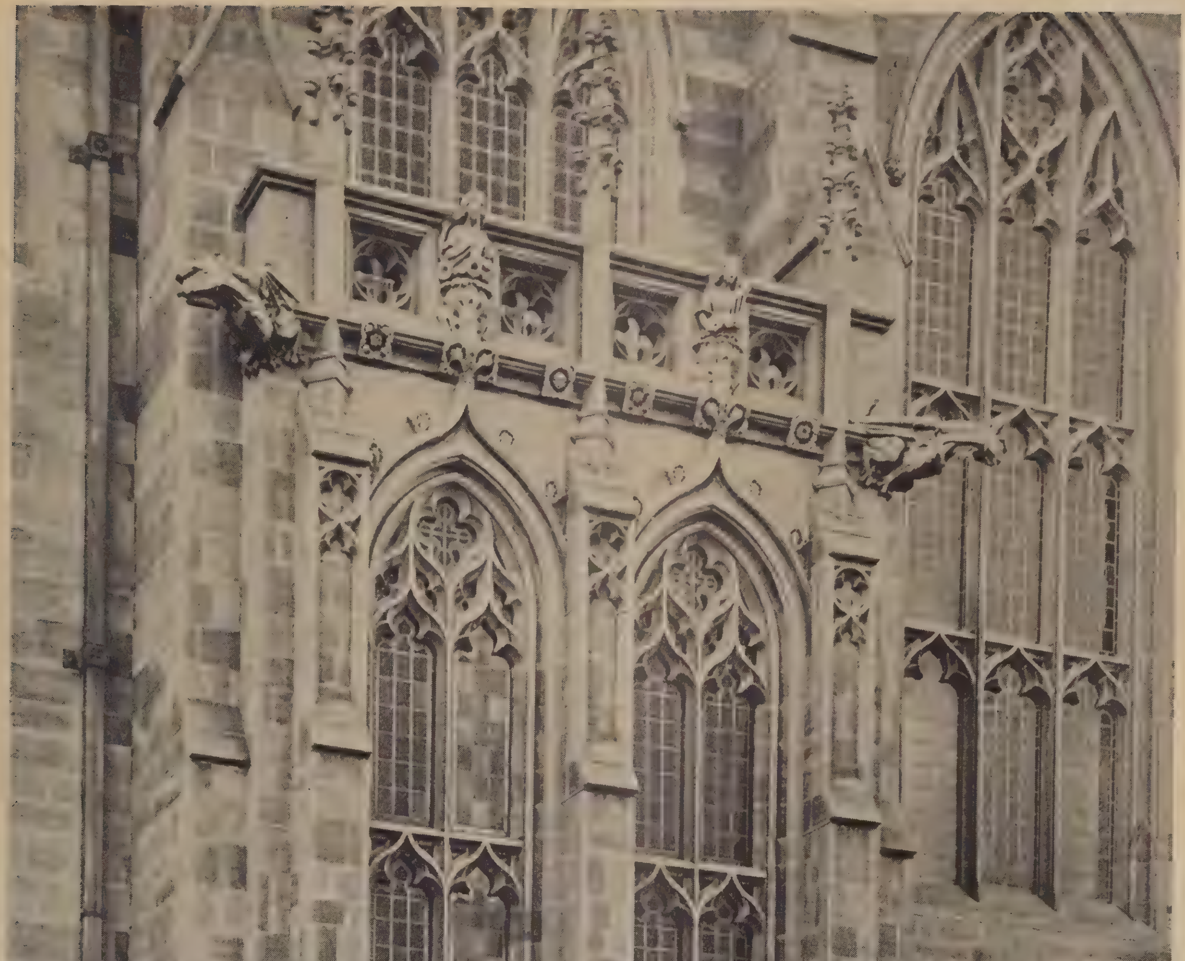
DETAIL, DOOR IN CONSOLE BAY



DETAIL, NORTH DOOR TO PASSAGE

CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT

CRAM & FERGUSON, ARCHITECTS



BAY ON NORTH SIDE, AND ARCHITECTS' DOORWAY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

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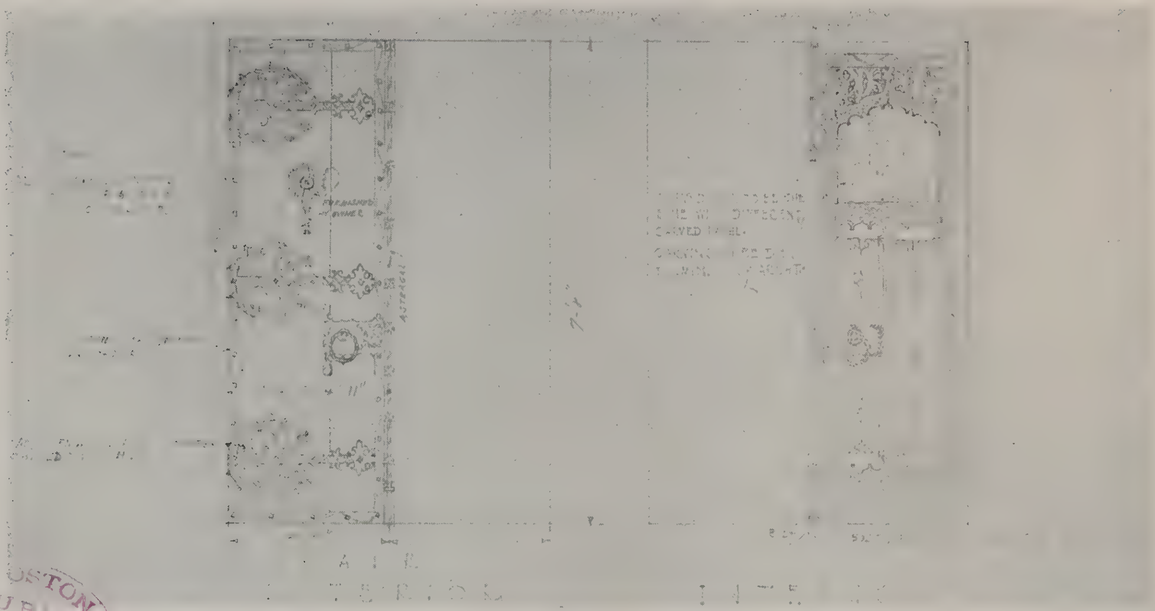

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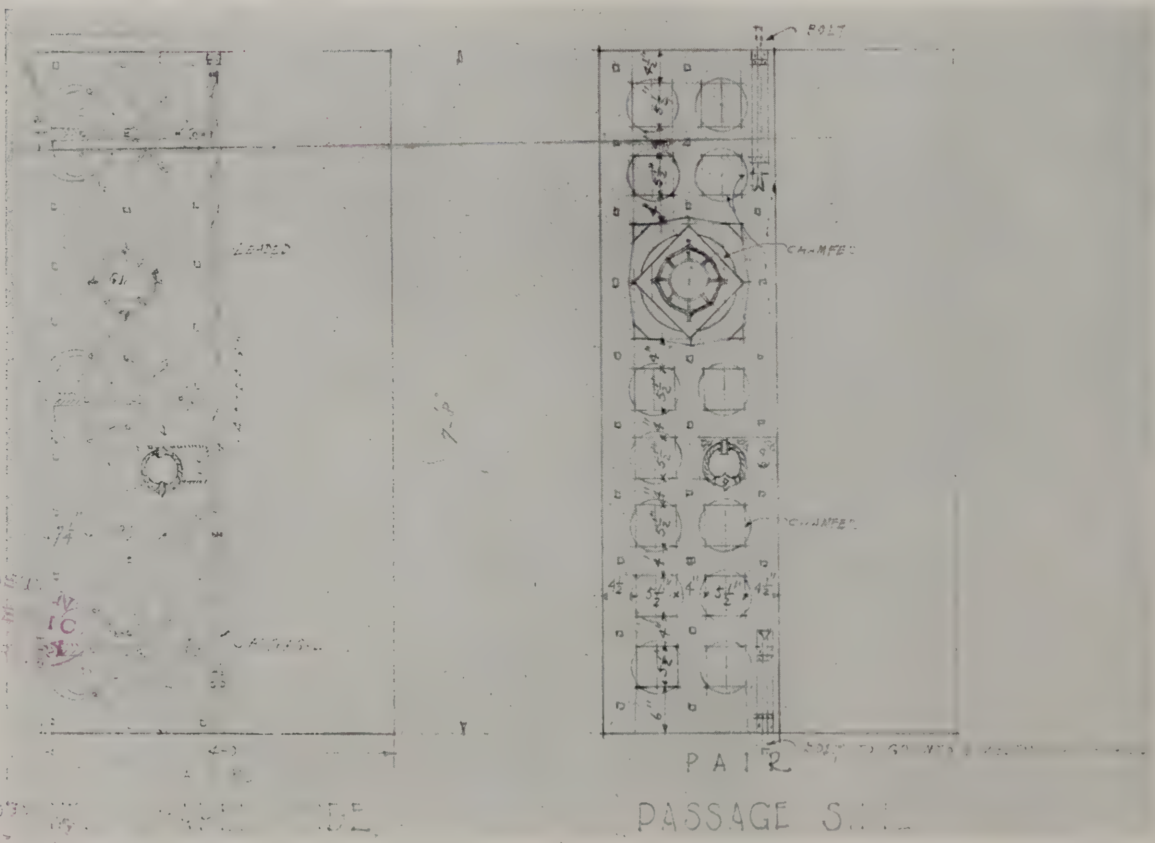
DETAIL, DONOR'S DOOR FROM CLOISTER TO TRANSEPT



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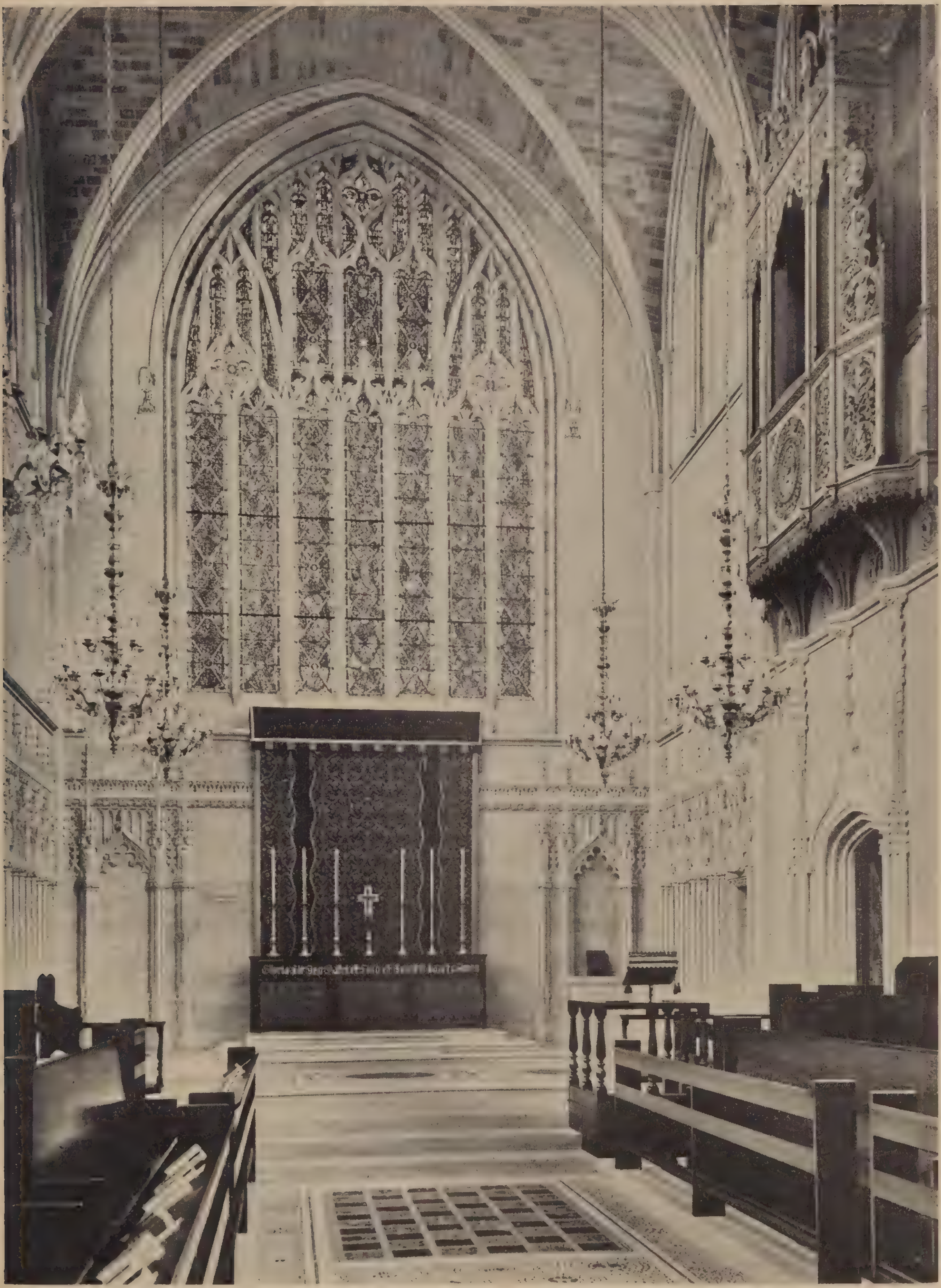
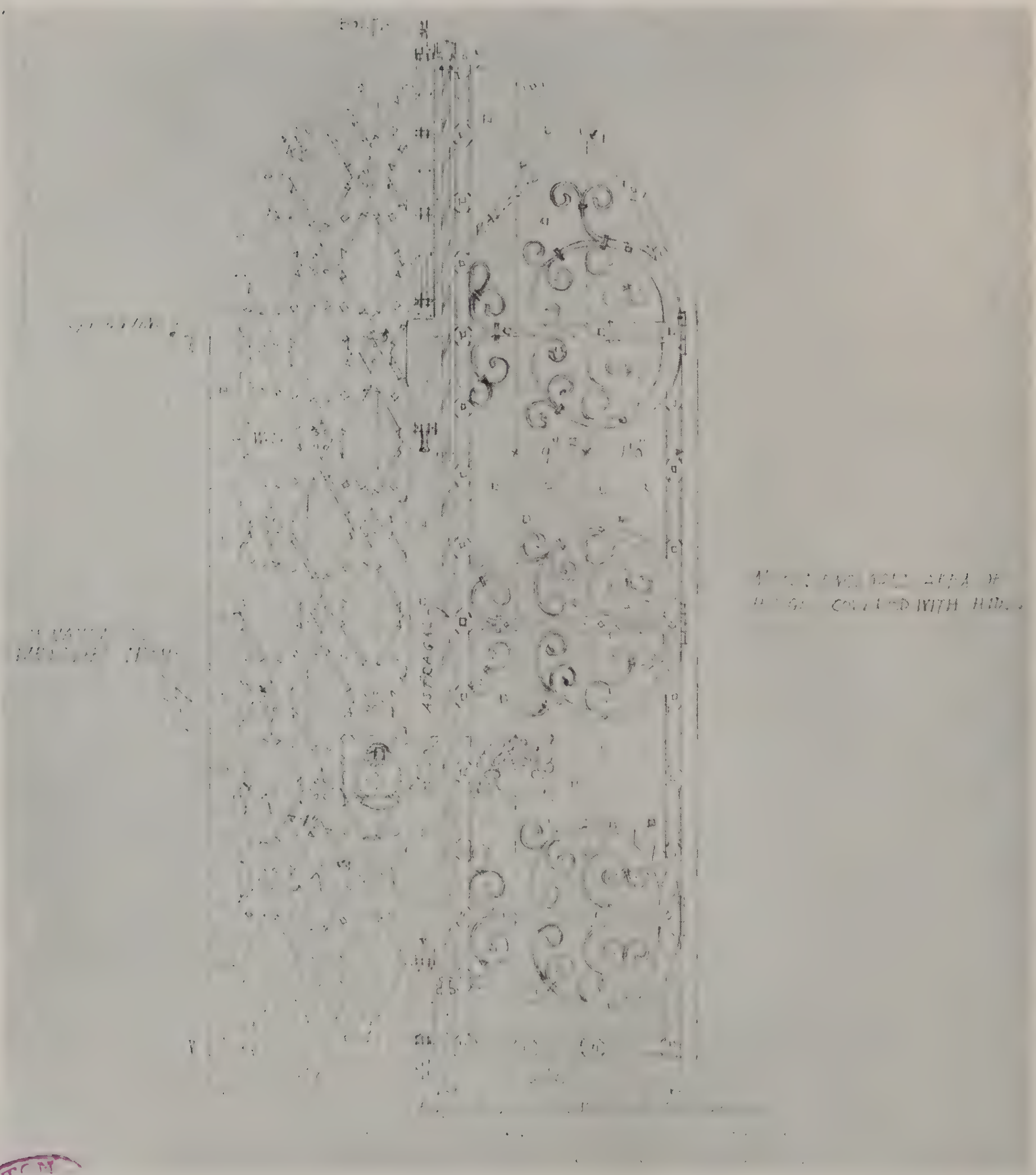
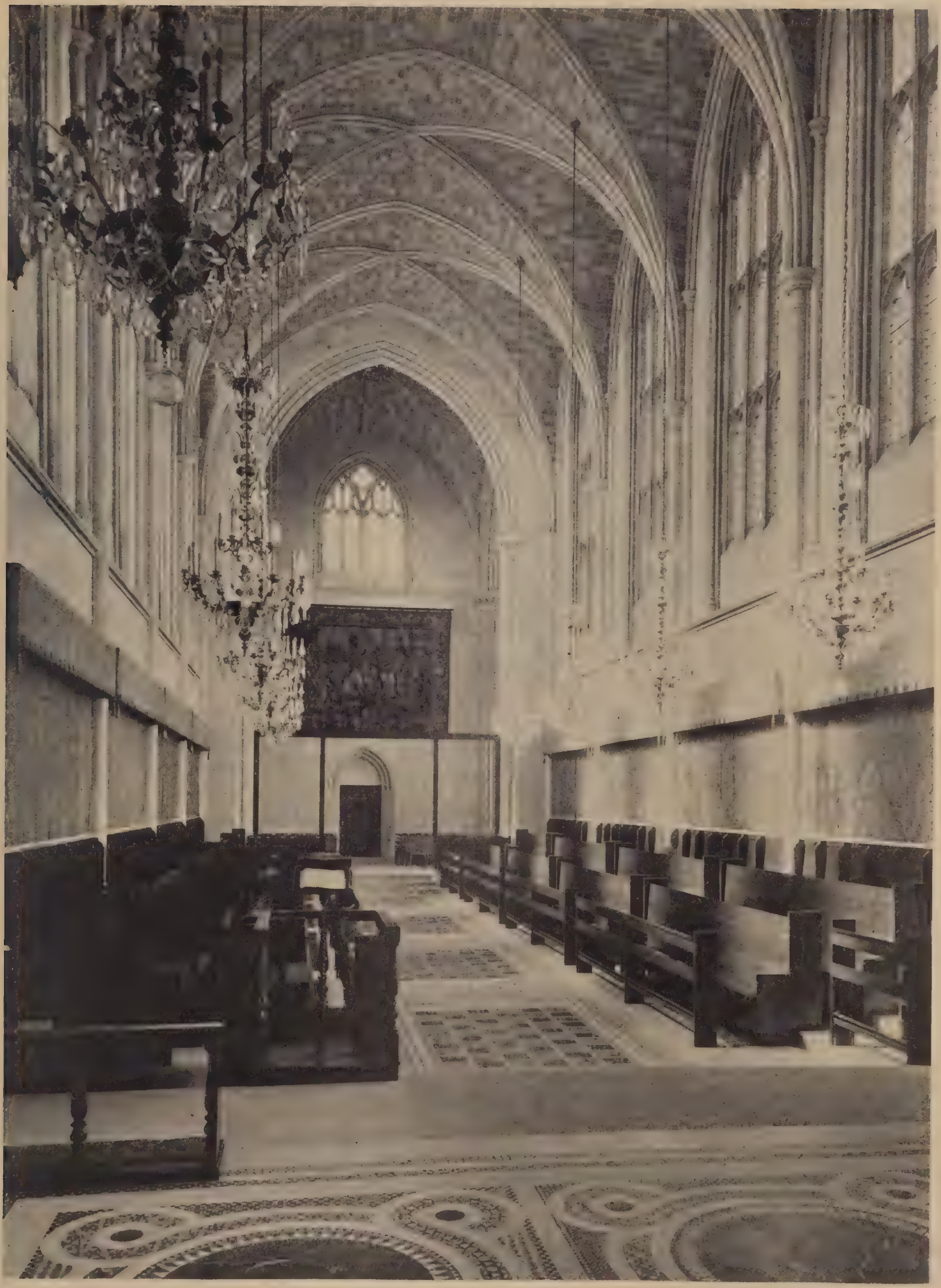
DETAIL, DOOR FROM ANTE CHAPEL TO PASSAGE
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



SANCTUARY
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



DETAIL, DOOR FROM CLOISTER TO STATIO
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS



INTERIOR, LOOKING WEST
CHAPEL, ST. GEORGE'S SCHOOL, NEWPORT
CRAM & FERGUSON, ARCHITECTS

THE RELIEFS AND GRILLES OF THE CHANIN BUILDING VESTIBULES

BY

RAYNE ADAMS

IN writing about the reliefs and grilles which decorate the vestibules of the Chanin Building in New York, one has a vague feeling that it may be necessary, quite at the outset, to take the offensive and establish, by way of bastions and barricades, some generalizations which will forestall to some extent the criticism to which these decorations will be subjected. Yet this need be an offensive of only the most gentle and retiring variety. It will have in it somewhat of the inviting arrogance, I trust, which clothes the aggressiveness of Montaigne's preface in which he informs the reader, with much placidity, that if he doesn't like the book, he need not read it.

Most designs are conceived and executed with little thought. This may be regarded as a statement sufficiently broad to set the judicious grieving. Be that as it may, I think it no looser than many another generalization which, though a fiction, is useful. It would seem that the common run of decorative design,—in all the many arts,—follows along no intellectual line of effort which is in any way exacting. Most of us choose the easiest path. If we have to portray winter, we picture it as "a weak old king who feels, like Lear, upon his withered face, Cordelia's tears." And all select a bluebird as a symbol for happiness. The æsthetic dreams of the world are built into the common clay of actuality by the use of a thousand thousand accepted conventions. When Arnold de Villeneuve discovered the book of the great Geber which was to bring him the secret of wealth and the secret of youth, he found the quest symbolized in two pictures and described thus:—"The first represented a flower with a blue stalk, red and white blossoms, and leaves of pure gold, which stood upon a mountain top, and was bent by a gust of wind which blew from a blood-red cloud. Around the flower was a circle of open eyes. Above the circle was a naked hand holding a sword transversely by the blade. Below was a heart transfixed by what appeared to be a long pointed nail or spike. The picture upon the last page of the book represented a king with a golden sword in the act of killing a naked child, and a beautiful winged figure catching the blood in a crystal vase." . . . And so on.

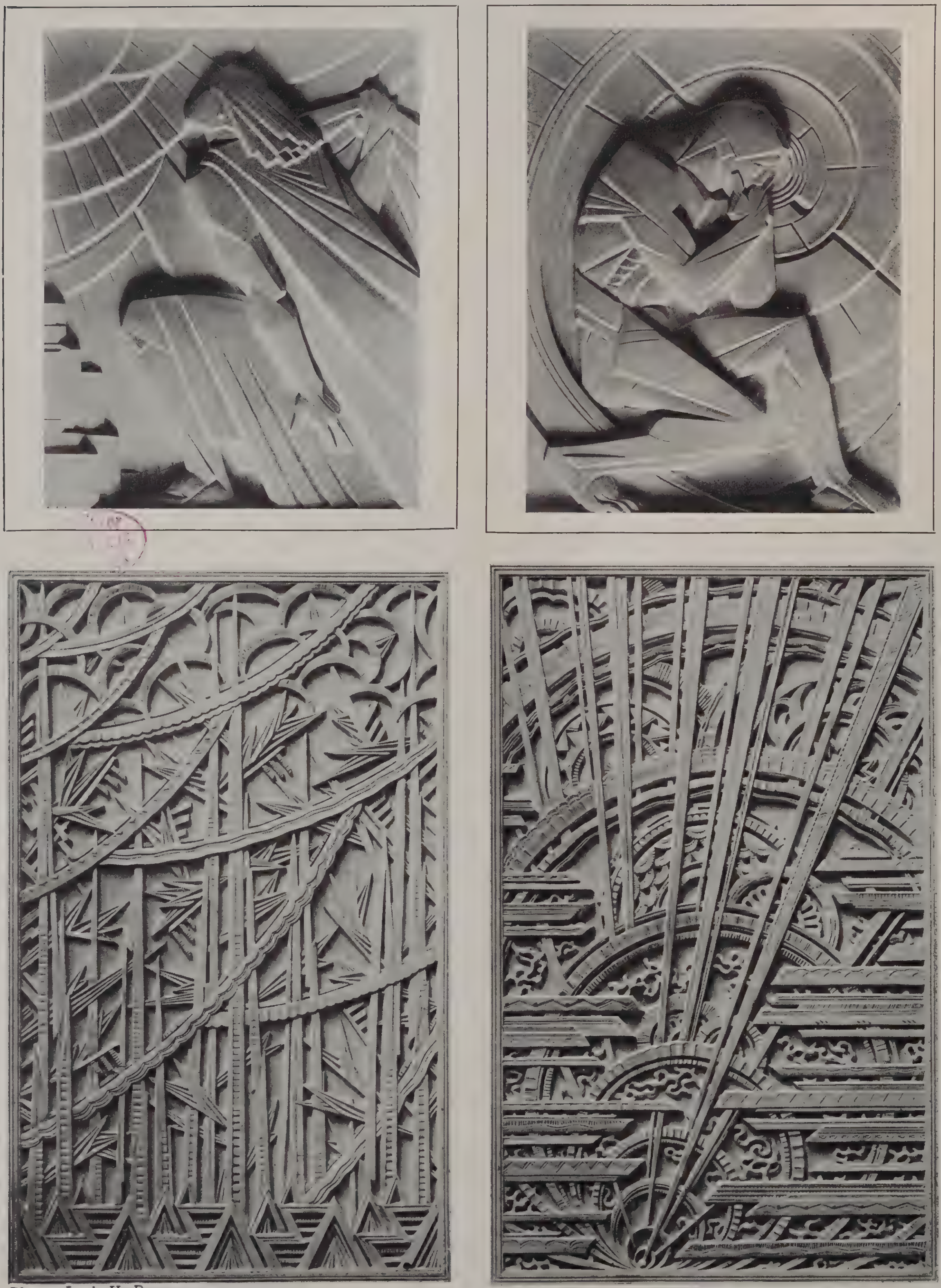
Of course it is charming; the fact that it has to do with the poignant story of Arnold gives the symbolism an emotional content. Yet even at its best, such symbolism bears with it the seeds of its own death; it sets up a convention the arbitrariness of which is only too apparent. It has too often a certain gross quality; it lacks subtlety, and it is frequently labored. Yet,—and here is the crux,—the all-important question to be asked is this: is the picture, in the old fashioned words, good looking? Does it please the æsthetic sense? If it does, we may justifiably close our eyes to the labored symbolism and go on our way with the sure conviction that we have in some manner, through emotional stress, even for one brief instant, been born again. And this symbolism,—what is it but a kind of alphabet, or more properly, a language? It is of course a language which we all know. But if the goal of art be Roman,—there are other roads to Rome.

Many years ago, in a strange book by George Winslow Pierce, I came across these lines, and they brought me sharply to the realization of the possibilities of a symbolism which, though belonging to geometry, is of the essence of poetry:

"My design on the cover, with its regular lines and heart-like curves, symbolizes the flower of Love and Truth. The fruit developed at the center is a star, which is the emblem of Unchange."

What Pierce did was to make geometry ideographic. And is our common alphabet more than a miracle of ideographic symbols transmuted into phonetic signs? Yet out of the alphabet and the languages which rise from it are built the appealing dreams of much of our emotional life. Hamlet is a creature of the alphabet. And if one make one alphabet,—why not another? And if the concatenation of events be conformable, as M. Aurelius would have said, to the ends for which Nature destined it, we may have what is commonly called a work of art. At any rate, the effort to achieve such a construction would seem to be worth while. Naturally, no such alphabet,—no such symbolism,—can be complete, and the more inelastic, the more recalcitrant the form of the art, the less subtle, the less satisfactory will be the symbolism. Nevertheless, in constructing a symbolic alphabet we give rein to our fancy, and as we develop the ideas based upon it, we have the assurance that there are, metaphorically, definite hooks on which to hang our hats. Good or bad, it will have a meaning,—if only for its inventor. The system of symbolism given, the final and momentous question remains: will it lead to an æsthetic result which will stir us? That however is, as the Greeks would have held, in the hands of the Fates.

The Chanin Building's vestibule reliefs and grilles, designed and modeled by Rene Chambellan in collaboration with Jacques Delamarre of the



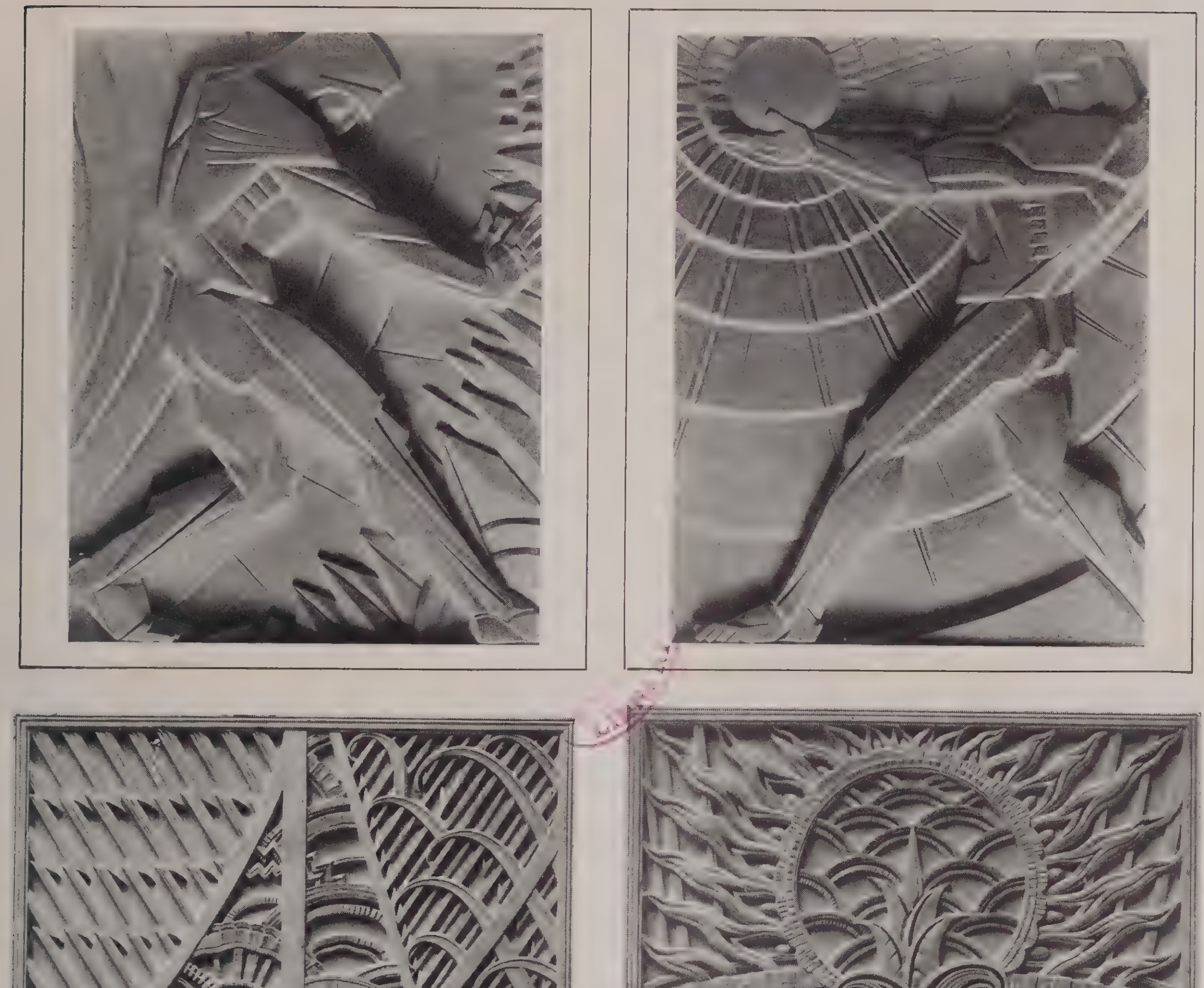
Photos. Louis H. Dreyer

AGITATION

VISION

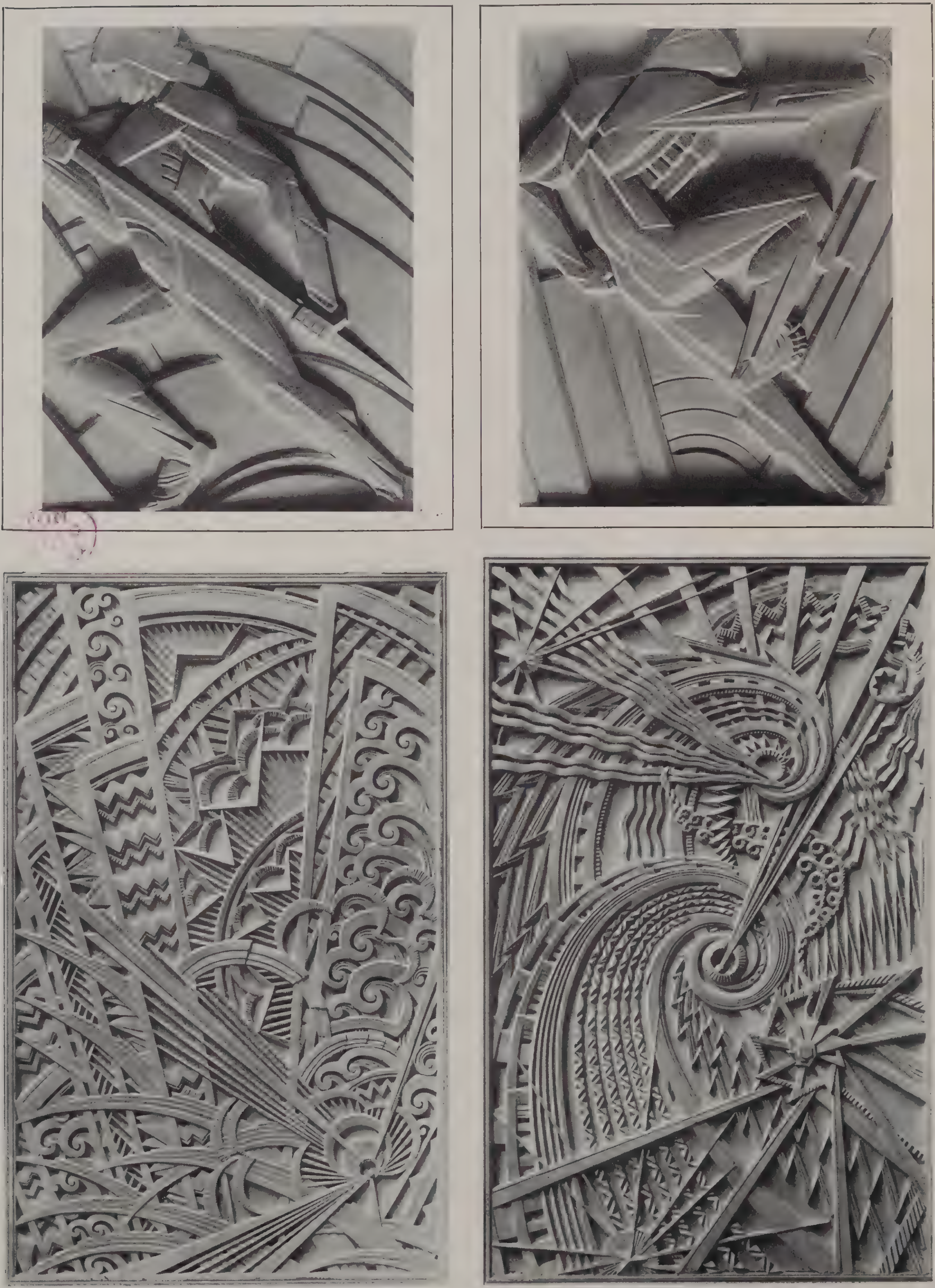
RELIEFS AND GRILLES, CHANIN BUILDING, NEW YORK

RENE CHAMBELLAN, DESIGNER. JACQUES DELAMARRE, COLLABORATOR



COURAGE ACHIEVEMENT

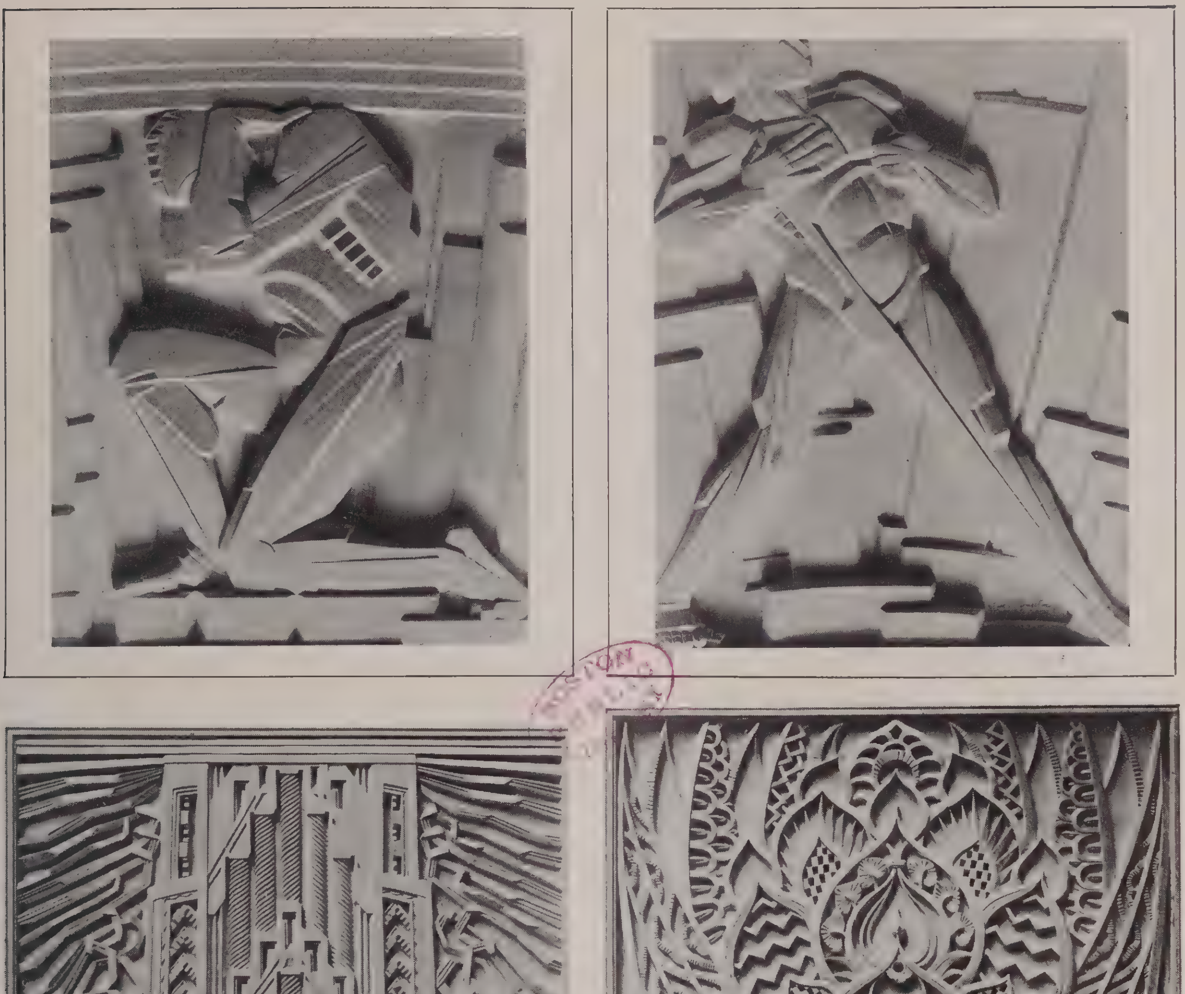
RELIEFS AND GRILLES, CHANIN BUILDING, NEW YORK
RENE CHAMBELLAN, DESIGNER. JACQUES DELAMARRE, COLLABORATOR



ACTIVITY

EFFORT

RELIEFS AND GRILLES, CHANIN BUILDING, NEW YORK
RENE CHAMBELLAN, DESIGNER. JACQUES DELAMARRE, COLLABORATOR



BOSTON

ENDURANCE SUCCESS

RELIEFS AND GRILLES, CHANIN BUILDING, NEW YORK

RENE CHAMBELLAN, DESIGNER. JACQUES DELAMARRE, COLLABORATOR

architectural staff of the Chanin Company, are an open expression of this attempt. The dominant idea which they have sought to set forth is the significance of geometric lines and their capacity to symbolize emotions and abstractions of thought and deed. God forbid, as the phrase goes, that I should here attempt to expand upon the psychology of geometric symbolism in the arts. Nevertheless, one may lamely point out that a consensus of opinion (whatever it may be worth) has established certain characteristics which are associated with types of line and of form. For vexation or perplexity we all scribble a confused scrawl; the flowing curve suggests ease and grace; the circle suggest completeness;—and so on until we come to those geometric lines and forms which have as yet not been so endowed with definite significance of this sort. Yet there is no reason why we should not make such endowment, and thus, armed with a quiver of symbols, build our geometric romance.

For those who have stood before the Chanin vestibule's grilles and wondered, saying, some demurely and others not, "What is this all about, and why?", it is not sufficient to answer them in their own manner and ask them, with Voltaire, "Why is there anything?" The *raison d'être* of these grilles is drawn from the life of a man who, in his chosen field, has achieved much,—and the aspects of his struggle and success have given Chambellan and Delamarre a theme which they have chosen to set forth forth in geometric symbols. In these reliefs and grilles they have envisaged this life under two commonly accepted categories,—that which sets forth the physical life and that which sets forth the mental life. This distinction, as every psychologist knows, is purely logical and artificial. That, of course, is granted; it is a convention, and it is artificial, just as all art depending on conventions is artificial. This distinction being granted, certain phases of development under each category are presented by a panel figure in relief supplemented by a grille design placed immediately beneath. In brief summary, that series which represents the mental development shows these various groups: (1) *Agitation.* This portrays the first conscious stirrings; the first doubts, the first questions and uncertainties. (2) *Vision.* We see here the representation of the birth of conscious planning and the formation of a definite and compelling ideal. (3) *Courage.* This shows the man at work,—following out, with firm resolution and steady purpose, those ideals which are his, beset by obstructions, yet achieving. (4) *Achievement.* Here we see the fulfillment of his work. The physical series, which contains the groups named,—Activity, Effort and Endurance, and Success,—exemplifies in its way the characteristics presented by the series showing the mental development. Of course, such a presentation of the life romance of an individual can hardly hope to be inclusive of all the factors. Chambellan and Delamarre have elected to use, as it were, a palette of high colors in developing their thought. The treatment of the panels can hardly be universal; it applies only to a certain type of man who has seen clearly and acted energetically. The symbolism would have to be expanded to give us a sense of "the blue and the dim and the dark cloths, of night and light and the half light."

The supplementary grille panels, wholly geometric in conception, present a symbolism which, interpreted, bears out the meaning of the corresponding relief figures. I have chosen the relief called *Vision* and its supplementing grille design, to set forth as a typical example of the symbolism which runs through all the work. In the relief, showing a crouching figure, we see the vacant look,—"the light drawn backwards from the eye" —betokening introspection and concentration; the bowed head characteristic of the thinker, and the supporting hands,—that gesture which has always something pathetic about, it—as though the strong hands of the body were giving support to the troubled mind. The mental world of this thinker is symbolically represented by the spiral convolutions, expanding in wider and wider sweeps, while his inspirations or impulses for action are marked by the indented, radial lines. The deepest indentation marks the definitive and determining inspiration under the ægis of which he will, for good or ill, follow through his life to some significant end. The grille design supplementary to this relief, bears out this thought. The dominant inspiration is represented by the continuous ray, which, passing through the barriers of doubt and ignorance, pursues its unbroken way. Other inspirations, other compulsions, are represented by the non-continuous rays; these are less perfect. The tangent rings, of successively increasing diameter, represent the successive phases of his life.

Such, in its outline, is the meaning of the symbols used. Similar symbolism runs through the whole series. Its authors have had the ingenuity and the courage to envisage the union of the fixed forms of geometry with the unstable and evanescent attributes which form the unmeasurable substance of the emotional and intellectual life. Whether the union has brought forth progeny whose æsthetic quality will stand, is something for the critics to decide. As an expression of a method of achievement, the work may be characterized assuredly as not lacking in the spirit of adventure. For my own part, I confess that I have rarely looked upon relief figures which have struck me as more worthy of praise than these. To say that they are masterly is not enough; they hold, for those of us who care for abstractions, what is far more important,—something of genius.

THE CHANIN BUILDING

SLOAN & ROBERTSON, ARCHITECTS

BY

MATLACK PRICE

ALREADY the multitudinous throng that finds its daily tasks in and about mid-town New York is accustomed to the Chanin Building, and tarries no more in its ceaseless coming and going to look up into the sky. So quickly are the achievements of this age accepted and assimilated! With imaginations released, perhaps, for more lofty flights after dark, there may be more whose eyes are drawn 670 feet aloft to an architectural island floating there in the sky,—the upper stories of the Chanin Building, floodlighted, glowing silently and beautifully, seemingly in another world,—immeasurably removed from the clamorous life of the street level.

But the Chanin Building must be seen as more than the latest great mid-town office structure, as more than merely the third highest of the towers of Manhattan. It is a splendid contribution to twentieth century architecture in that it powerfully rationalizes all the novel features of this new style,—and it is a splendid contribution to the architecture of all time because it is good design.

The architects have not here compromised a fine vision either with major errors in scale or with minor trivialities. This is the realization of a fine vision of a great tower, rising sheer above a massive sub-structure. This base, itself a building of impressive proportions, is composed of receding masses, all mounting upward,—then the tower is given sheer height, uninterrupted, not weakened,—up to the vigorous silhouette of its top against the sky. At the street level there is interesting design,—detail where detail can be seen,—a bronze frieze along above the shop-fronts, unusual entrance shelters, with self-contained lighting, and above the street floor an all-over pattern of modeled terra cotta. There are those who feel that this pattern is out of scale, and that it is perhaps a dangerous architectural adventure from the point of view of design. But a change in scale may well prove to be one of the astonishing changes that twentieth century design brings with it. This is a large building, large enough, perhaps, to create a few laws of its own.

If the major premises of twentieth century architecture are accepted,—and their acceptance cannot be long withheld,—even the most conservative must accept many minor expressions in design and ornament that are as logical a part of a Chanin tower as classic friezes were a logical part of the Parthenon. Like the New York Telephone Building, the Chanin Building is an impressive realization of the most hopeful predictions that were made years ago, when the zoning laws first imposed the set-back restriction on tall structures. At once it became necessary to design in masses rather than in facades. The facade always offered too strong a temptation to create "paper" architecture. Buildings were not so much buildings as they were sets of elevations,—and elevations, of course, had to be detailed, and they were! With a paper elevation tacked down on the drawing board, the crowning stories of a 30- or 40-story building looked like as good a place to put a lot of fine detail as did the stories down at the street level. And, designing carefully "in scale,"—on paper,—the detail far up aloft usually corresponded exactly to the detail that was to be seen down at the entrance. The result was that buildings were detailed rather than designed.

Now structures like the Chanin Building are designed in great vigorous masses, and are detailed only where detail will mean something,—that is, where it can be seen at fairly close range. The top of the Chanin tower is a splendid piece of mass design, being neither abruptly blunt nor weakly tapered off. At the risk of expressing what may be purely a personal reaction, though I believe there is more to it, I feel impelled to make here certain observations about this matter of terminating towers, and especially the towers of these new buildings of which mass and massiveness make the keynote. Is it not a fallacy, and a contradiction of essential form, to weaken the top of a massive structure with a point or a spire? It is very often done, perhaps because of a lingering memory that the spires of Gothic cathedrals, pointing heavenward, give an effect of mounting upward, thus symbolizing the aspirations of man,— and so forth. But how about Durham Cathedral, with its superb, square-topped Norman towers? Or, for that matter, Westminster or Notre Dame? Given certain basic changes in manner and scale, what would the Woolworth Building gain in majesty without a spire? What would the Chanin Building look like *with* a spire? I do not mean to compare these two buildings, for they are expressions of two quite different eras. I merely want to raise the question as to whether or not there may not be something very like a sentimental fallacy about spires and points on towers,—some unexamined notion that they add an elegant and proper "finish." In terms of abstract design (forgetting buildings), a cone or a pyramid is weaker than a cube. In the design of a massive building, can a tapering shape do anything but weaken the whole effect? As an experiment, imagine the New York Telephone

Building finished off with a pyramidal top! Perhaps it takes a little more courage to terminate a tower squarely and vigorously,—but that very courage is expressed in the resulting effect. It may be that tradition has such a strong hold on us that architects do not stop quite soon enough when they are designing towers. They complete a great four-square tower and, failing to realize its completeness, they top it off with slanting lines that defeat much of the effect of sheer height that they might have attained. No such weakness mars the effect of the Chanin Building. Looking up at its great mounting silhouette, it seems as though a successful architectural paradox has been accomplished,—a building that possesses both mass and height.

In the old days when the first "skyscrapers" began to amaze and slightly worry the architecturally minded, the question of possible heights was much discussed. The whole idea was new, and skepticism flourished. It was seriously doubted, by many, that the Flatiron Building would withstand a heavy broadside wind. It might blow over! Flying machines were, demonstrably, impossible, though many daring seers voiced their belief that a day might come when automobiles would be almost as numerous as horse-drawn vehicles! When the structural height limit of steel buildings came to be realized as far greater than had ever been supposed possible, it seemed to many that there must be an æsthetic height limit,—that too great a sheer height must prove distressing to the eye as well as impossible of any legitimate architectural treatment. The new type of building has solved that. Now a great coördination of masses can be piled up to a height even greater than that conceived a generation ago for a tower, and from the summit of this mass there may rise a tower that climbs upward to an altitude far greater than that of the building it springs from. The result, as we now have tangible evidence, has a new and vigorous beauty, entirely its own and entirely unlike anything the world has ever seen. The architect no longer needs to decide whether he will design a massive building or a tower,—he can do both in one gigantic composition. The new apartment houses are rapidly realizing the possibilities afforded by the terraces that lie upon the shoulders of their set-backs, and these are being utilized as gardens, far above the noise and confusion of the streets. There are terraces, too, on the shoulders of our new towering office buildings, and it cannot be long before these too will be utilized as glassed-in studios or "daylight" offices, —perhaps whole rooms of glass, in which the modern executive will recoup from the sun's energy what he expends in his daily labors!

Returning once more to design, it seems indeed that the architect's only course in designing structures such as the Chanin Building, is to break courageously with the past. There is no architectural precedent for this new type, and if old details are to be used at all they must be used very sparingly and in a much modified form. The Chanin Building does not need pilasters and garlands and consoles and all those old familiar bits of bric-a-brac that have well and faithfully served their purpose through many years, and it has been found that it is only ridiculous to set urns and obelisks on the parapets of the great set-backs of the new buildings,—a practice at first followed through some lingering notion that this might confer a refining touch,—when the very scale and majesty of the whole composition magnificently transcends any necessity for there being such artificial and relatively trivial accessories.

Editor's Note. No presentation of the Chanin Building could do it justice or be complete without some description of the very remarkable and beautiful entrance vestibules, concourse and elevator lobby. All of the interiors of the public part of this structure as well as the superb suite of offices to be occupied by the Chanin firm on the 52nd and 53rd floors were designed and executed by the architectural department of the Chanin Construction Company, of which Irwin S. Chanin is president and J. L. Delamarre, the department head. These lobbies and the concourse are splendid examples of the unlimited possibilities of the modern style of interior architecture and decoration. Here, as may be judged from several illustrations shown on the plate pages, marble and bronze have been combined in most interesting and artistically original designs. Rayne Adams' article on the reliefs and grilles of the main foyer or concourse, which extends through the building from 41st to 42nd Street, gives an excellent idea of the immense amount of thought and study which was expended by Mr. Chanin and his able assistants on the design and decoration of the public areas. Unlike the architectural decoration found in the interior of the New York Telephone Building, where floriated forms were chiefly used, geometrical shapes and devices in unusual and beautiful designs here characterize all of the architectural ornamentation. The use of colored marbles combined with brass and bronze for the walls and floors gives a warmth of color which is one of the features of all modern interior design. The treatment of the several show windows opening from the stores onto the concourse has a distinctly contemporary French feeling. Decorative bronze door frames and over panels are of particular interest. Such details as the large lanterns of the concourse, the directory board, the mail box and the doors and walls of the elevator lobby have been designed with great care.

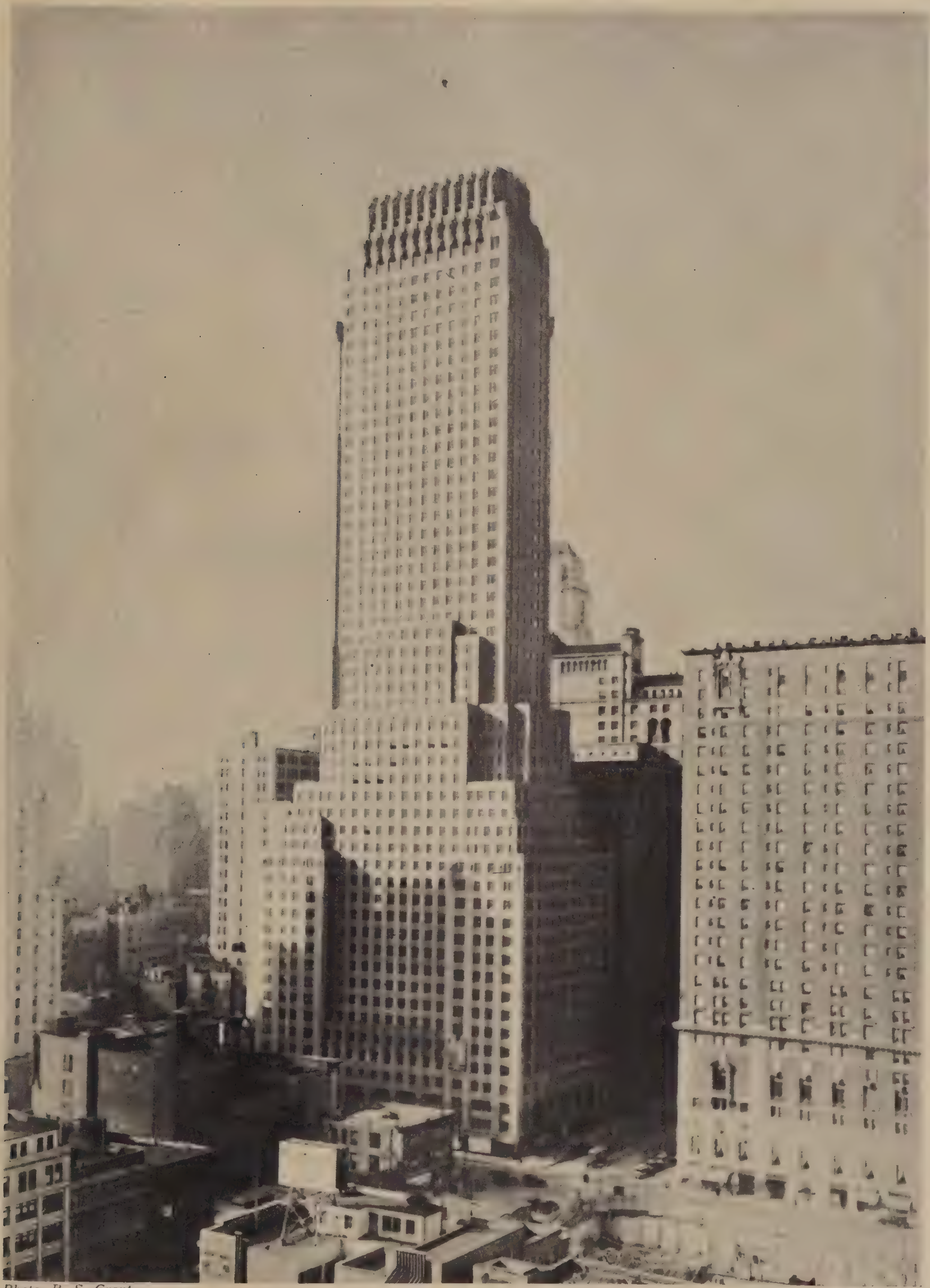
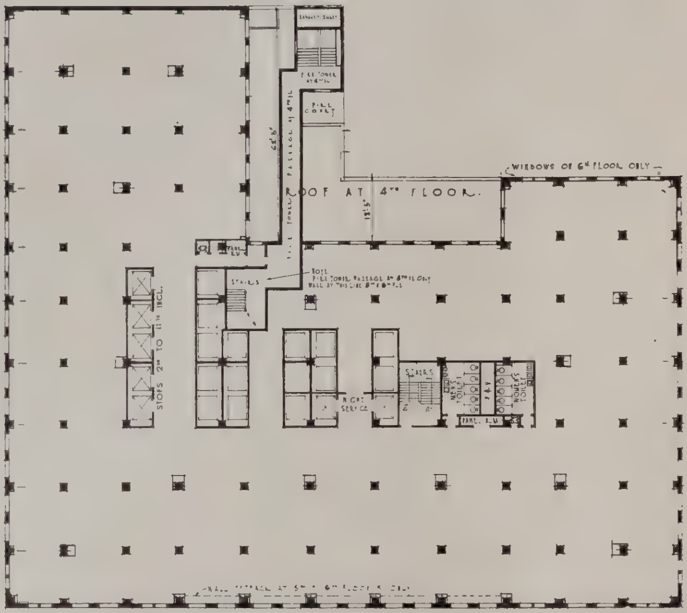


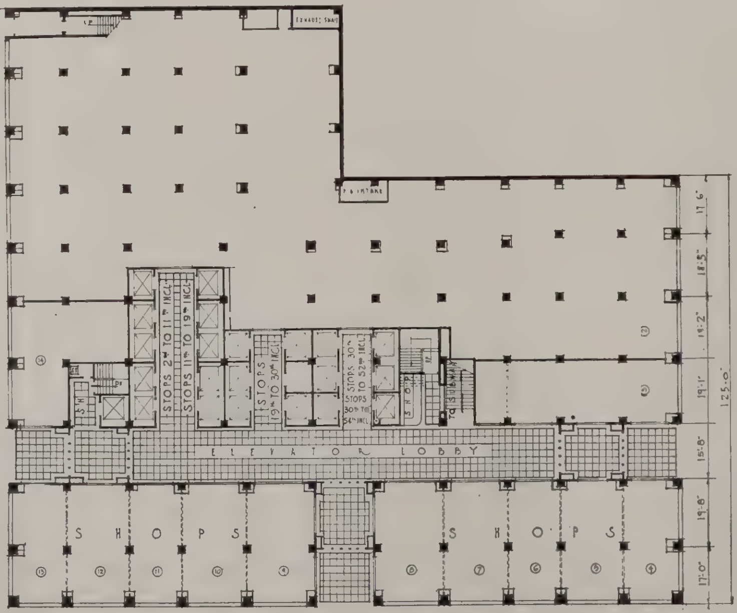
Photo. R. S. Grant

Plans on Back

CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



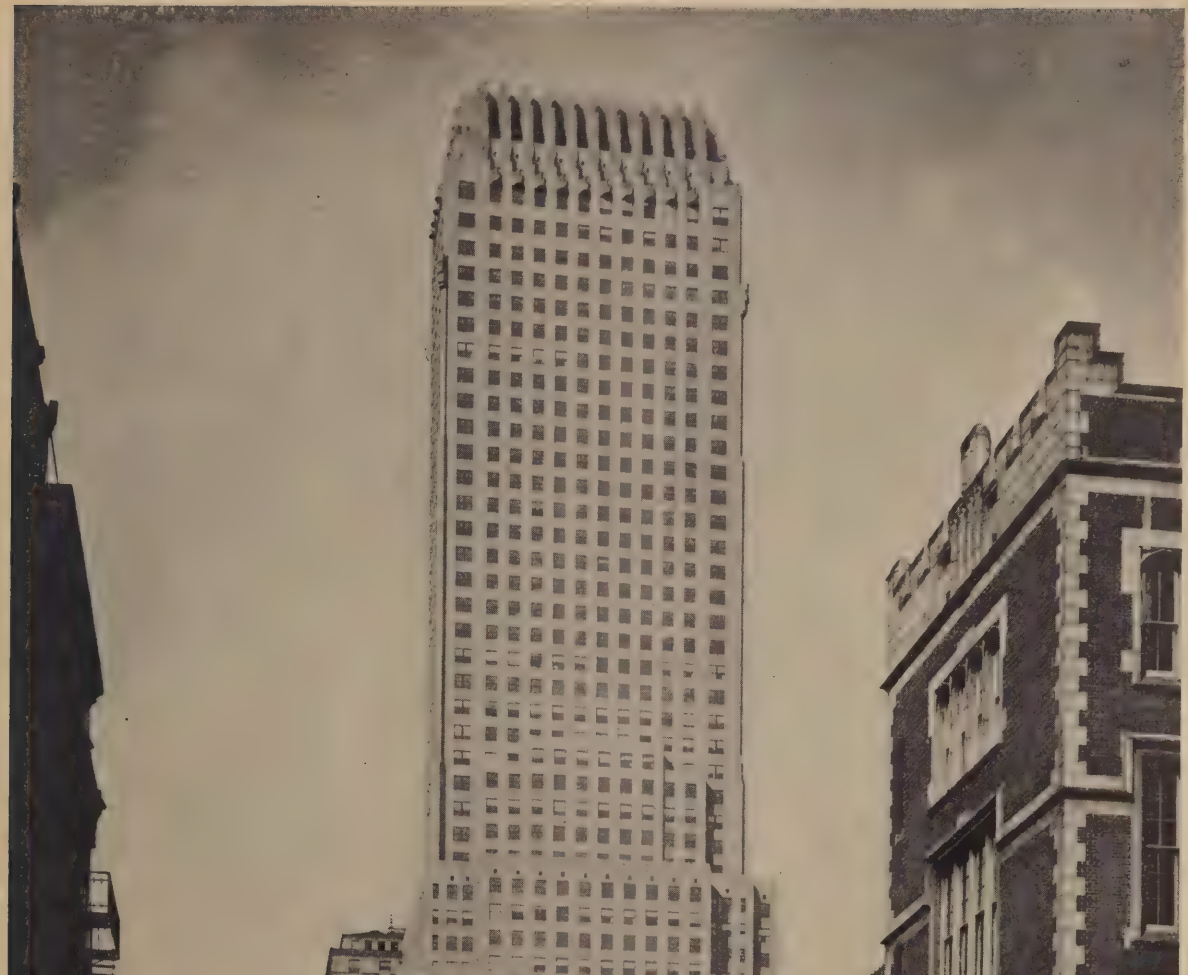
FOURTH TO SIXTH FLOORS



GROUND FLOOR

PLANS. CHANIN BUILDING, NEW YORK

SLOAN & ROBERTSON, ARCHITECTS



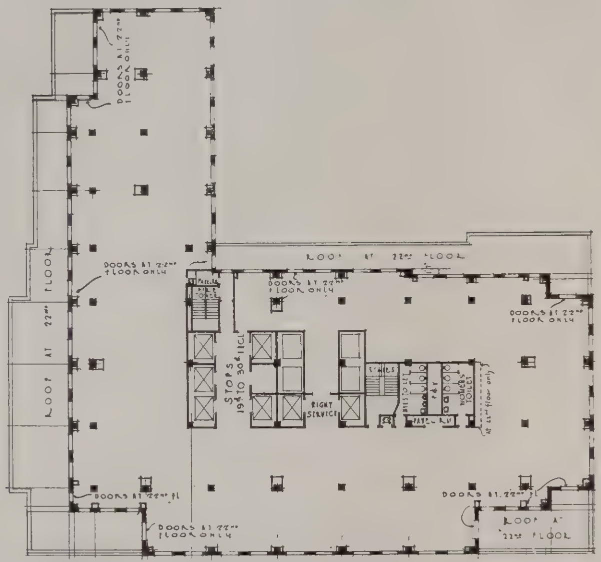
Photos. Sigurd Fischer

Plans on Back

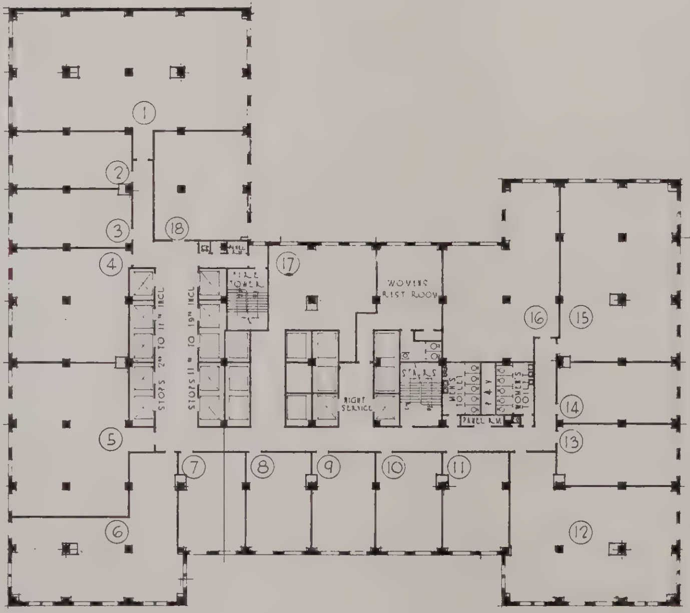
VIEW FROM EAST 41ST STREET

CHANIN BUILDING, NEW YORK

SLOAN & ROBERTSON, ARCHITECTS



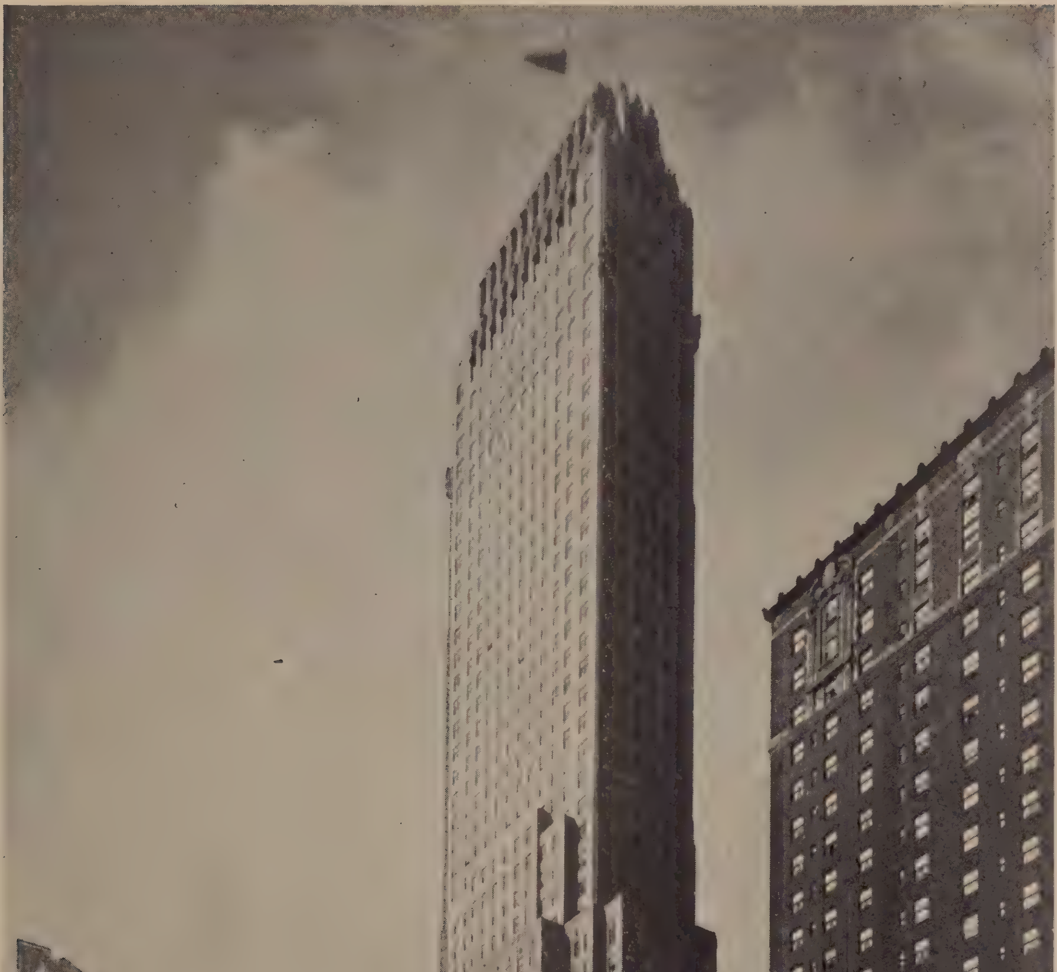
TWENTY-SECOND TO TWENTY-FIFTH FLOORS



ELEVENTH FLOOR

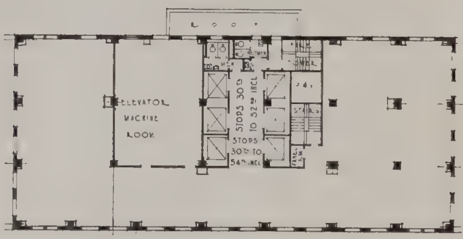
PLANS. CHANIN BUILDING, NEW YORK

SLOAN & ROBERTSON, ARCHITECTS

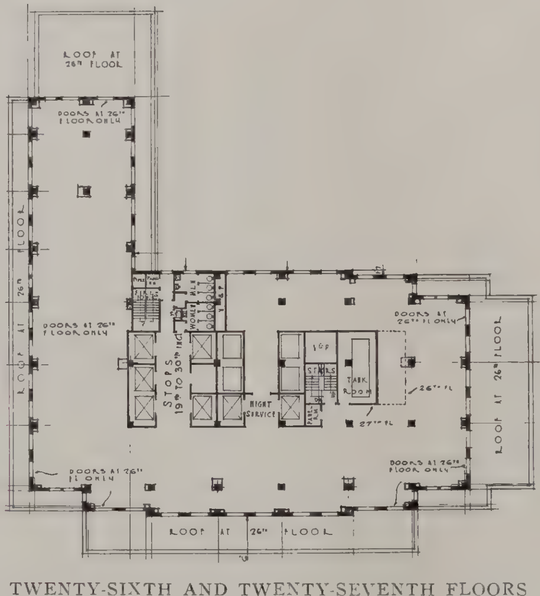


Plans on Back

LEXINGTON AVENUE FACADE
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



THIRTY-SECOND FLOOR



TWENTY-SIXTH AND TWENTY-SEVENTH FLOORS

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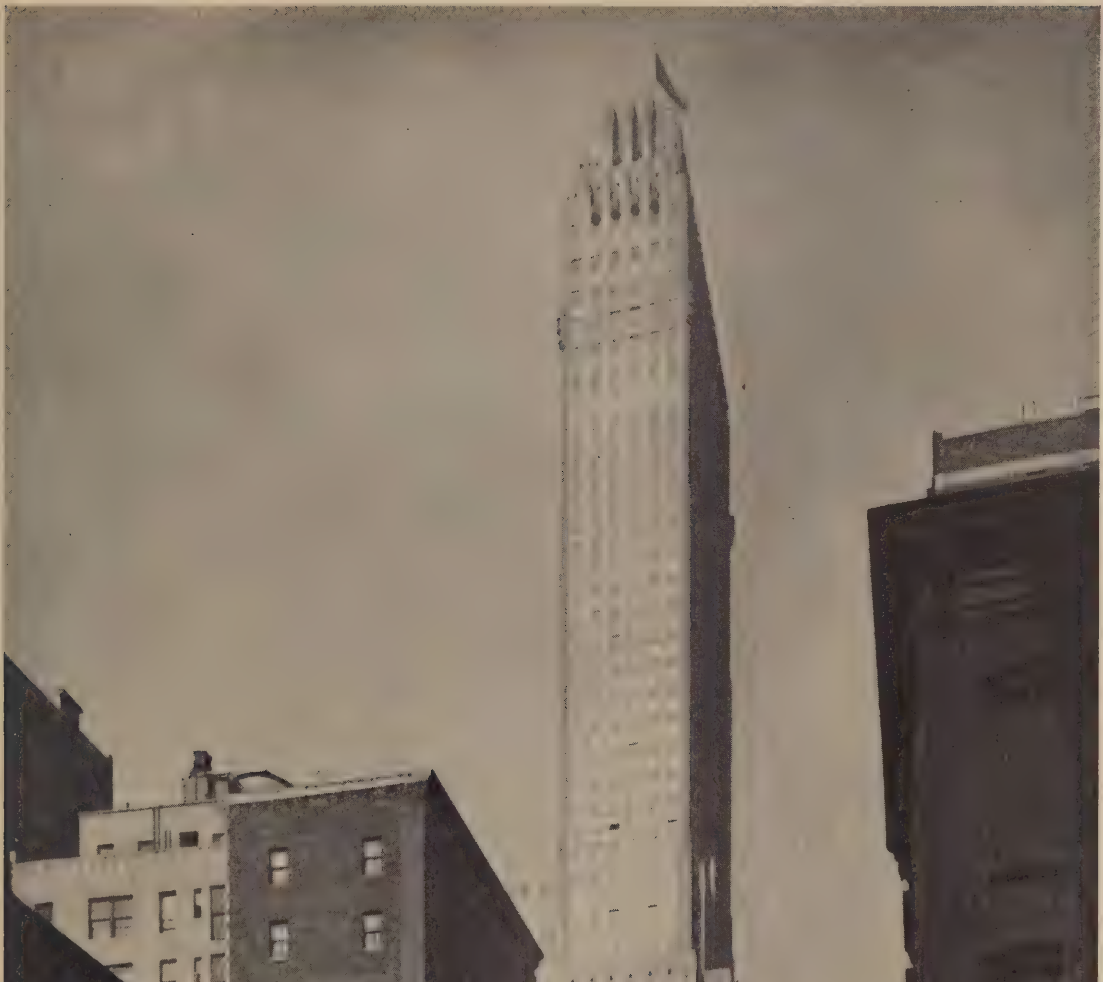
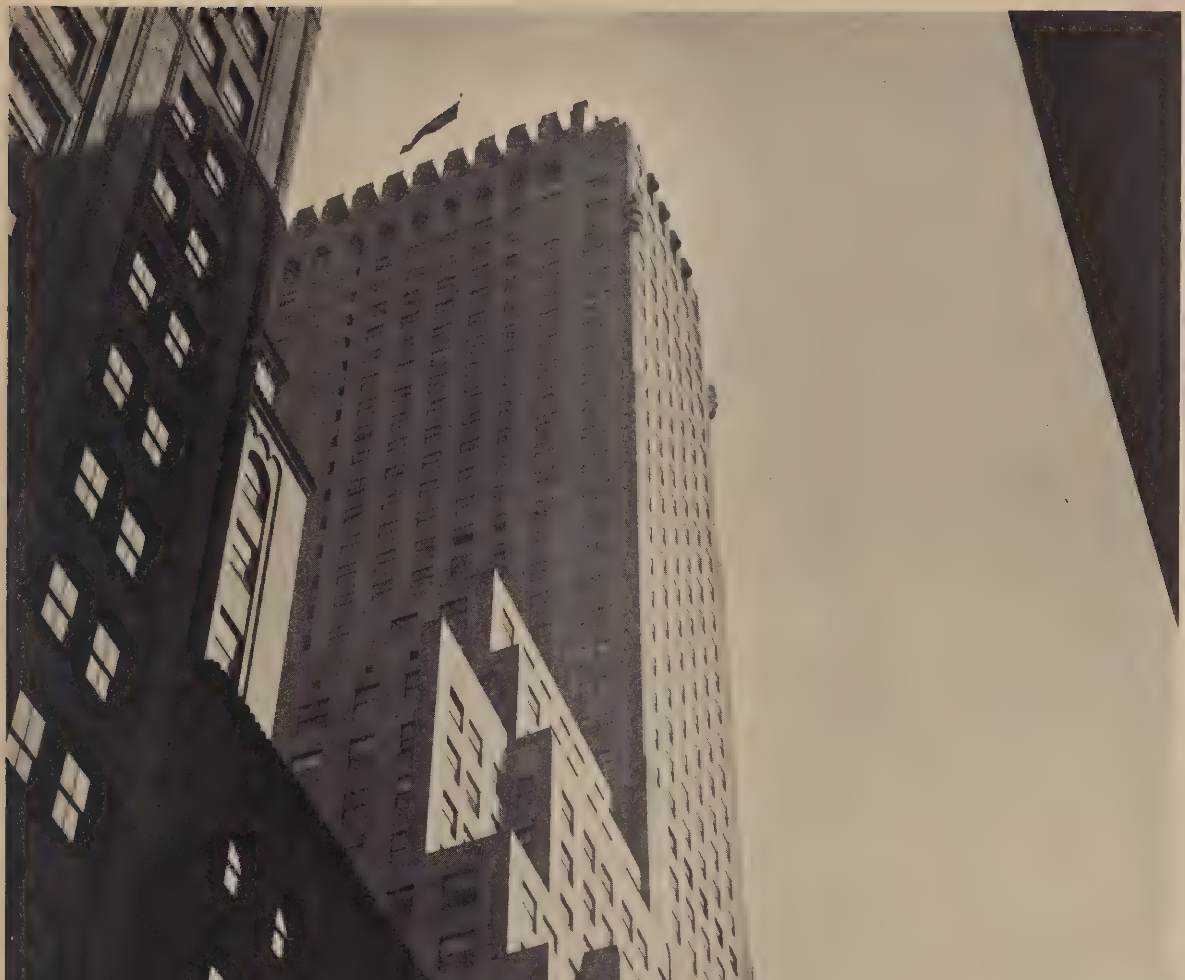
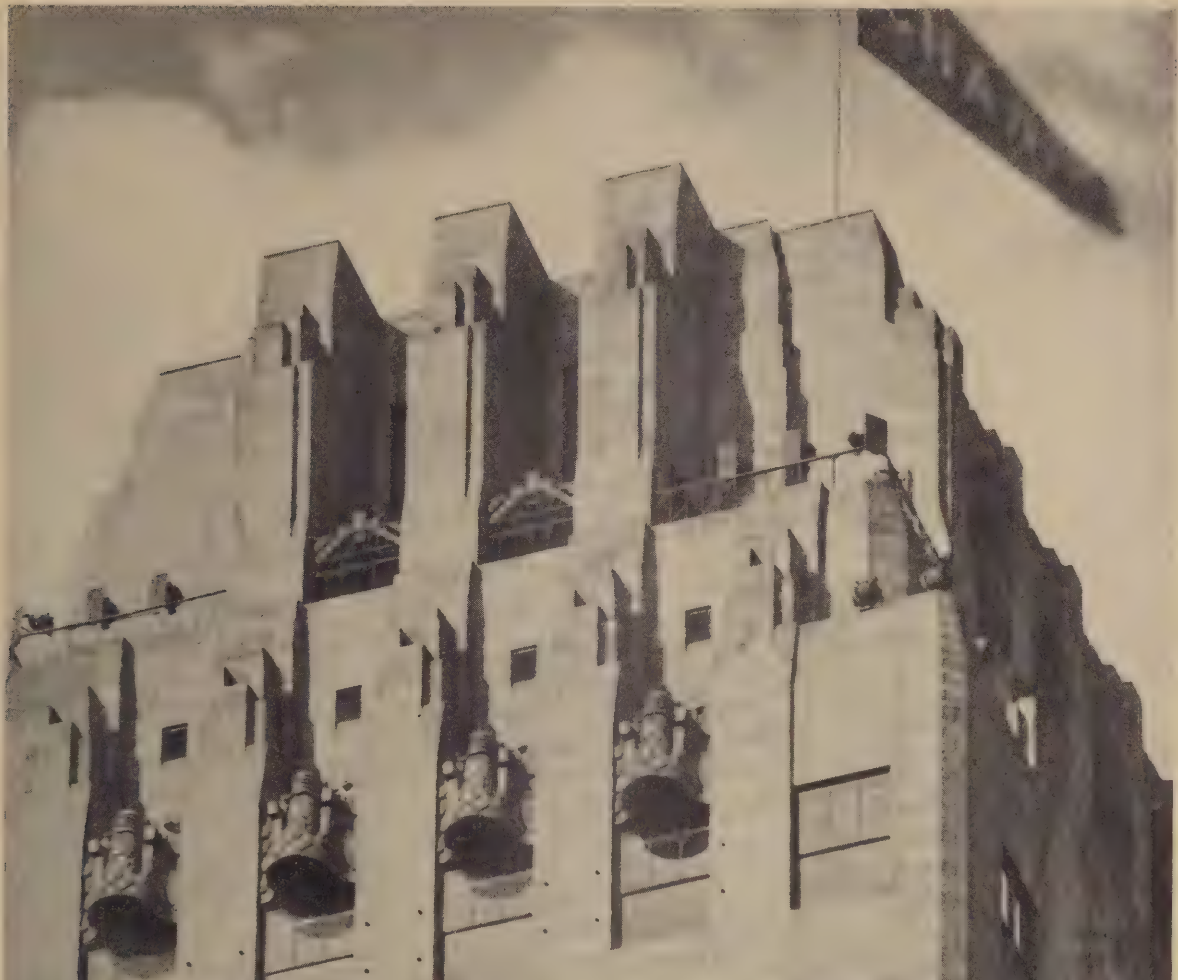
PLANS. CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



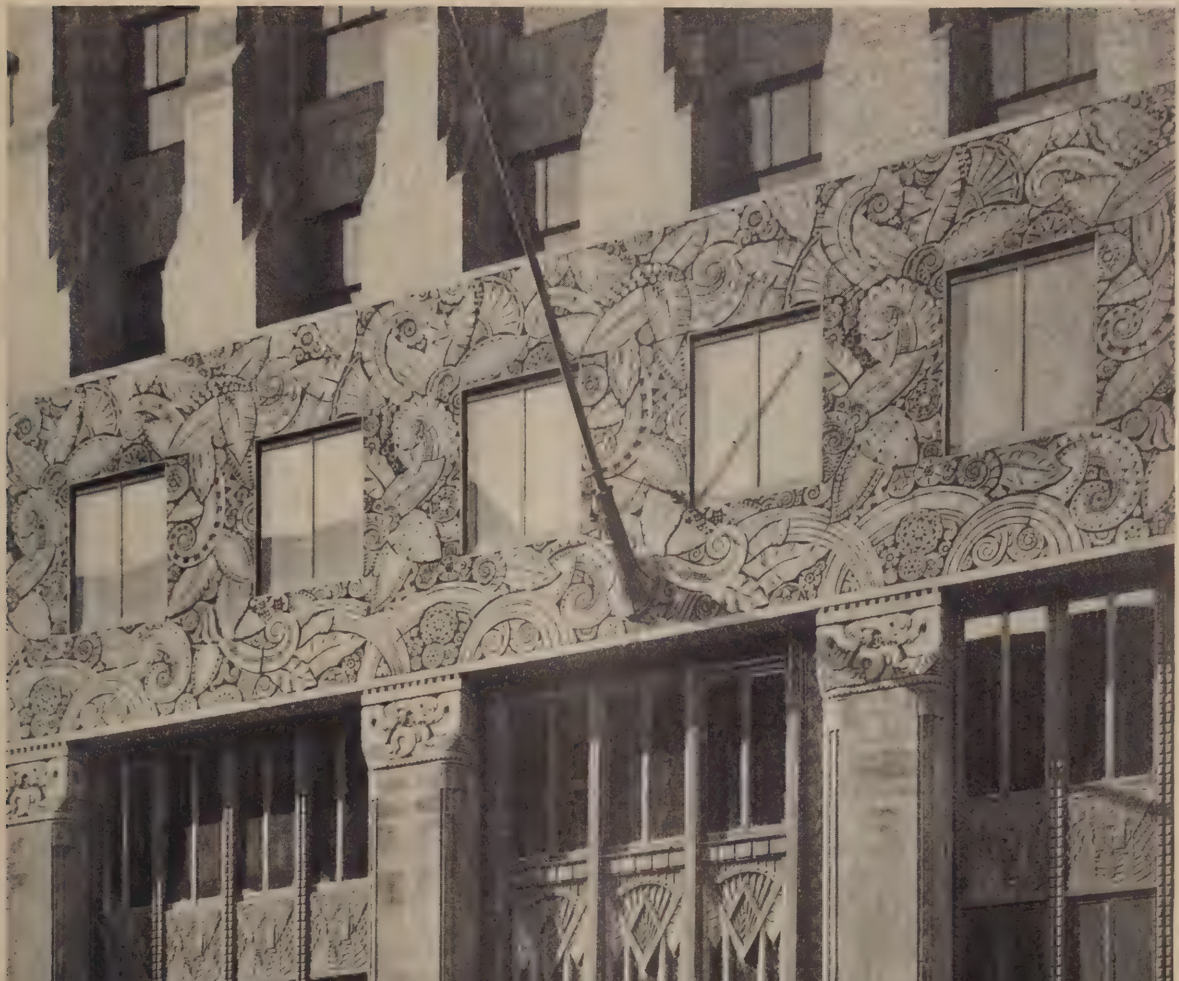
VIEW FROM LEXINGTON AVENUE
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



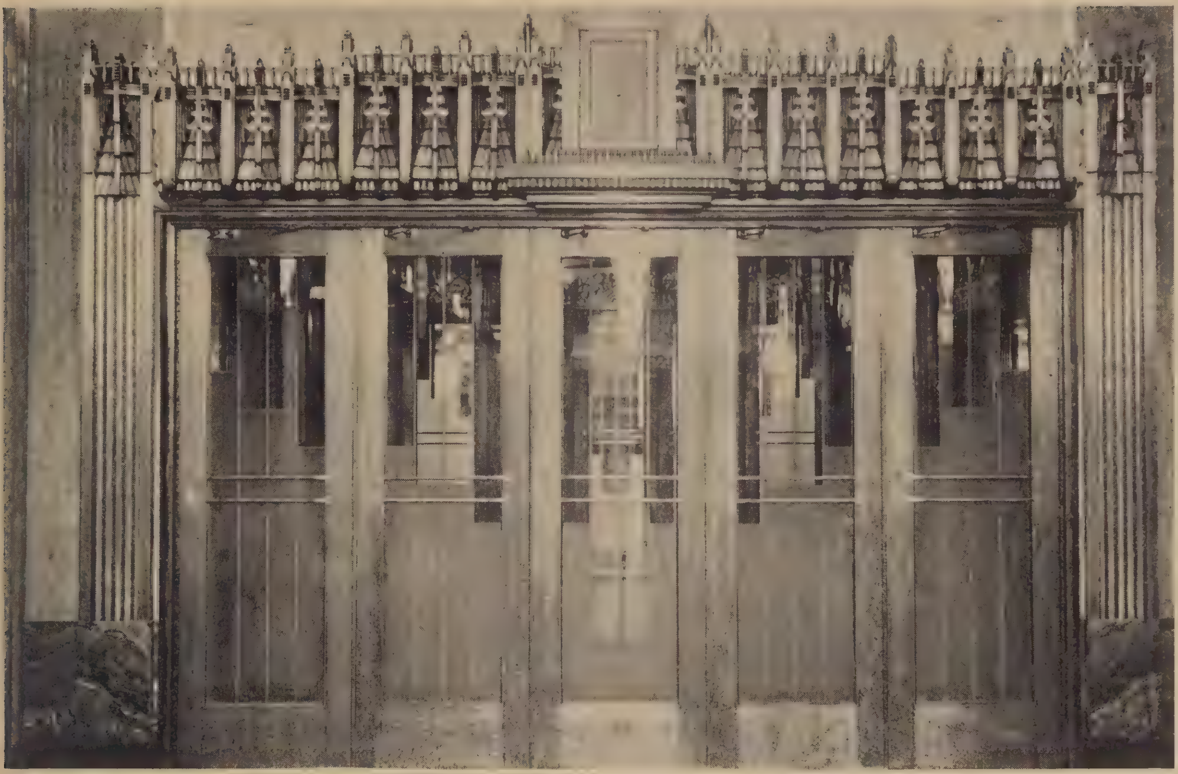
VIEW FROM EAST 41ST STREET
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



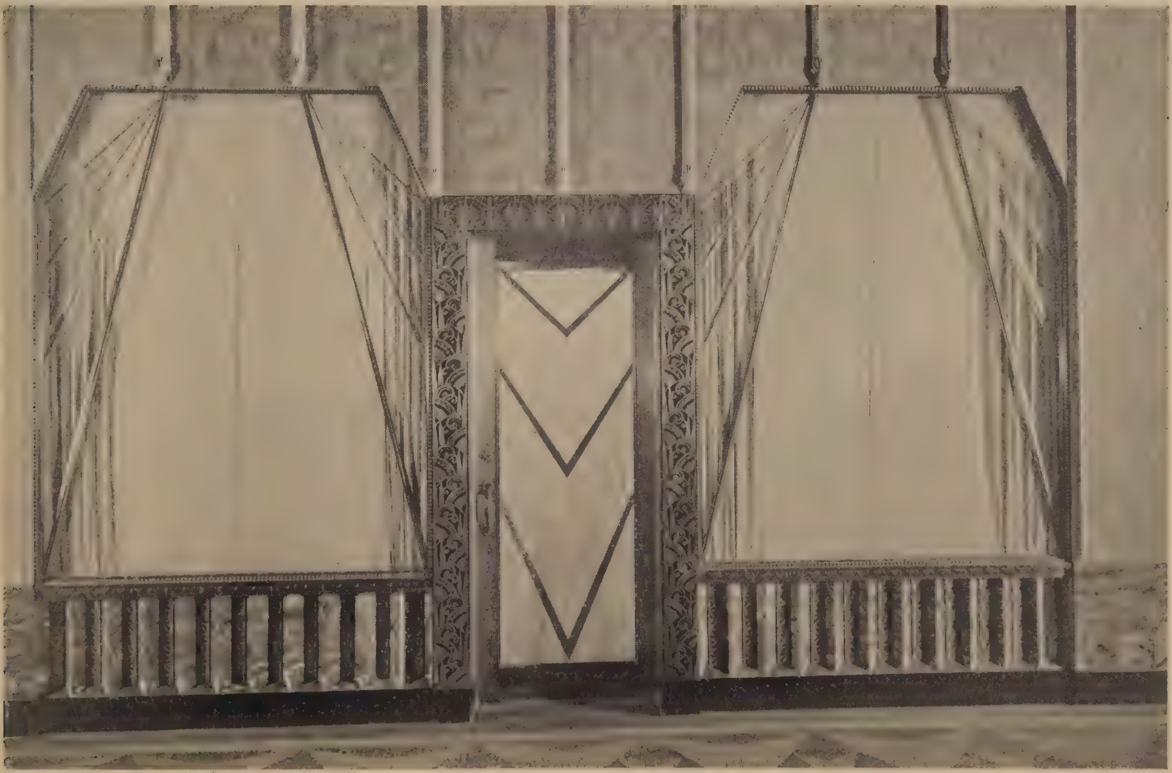
DETAIL OF UPPER STORIES
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



MAIN ENTRANCE
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



ENTRANCE DOORS IN LOBBY

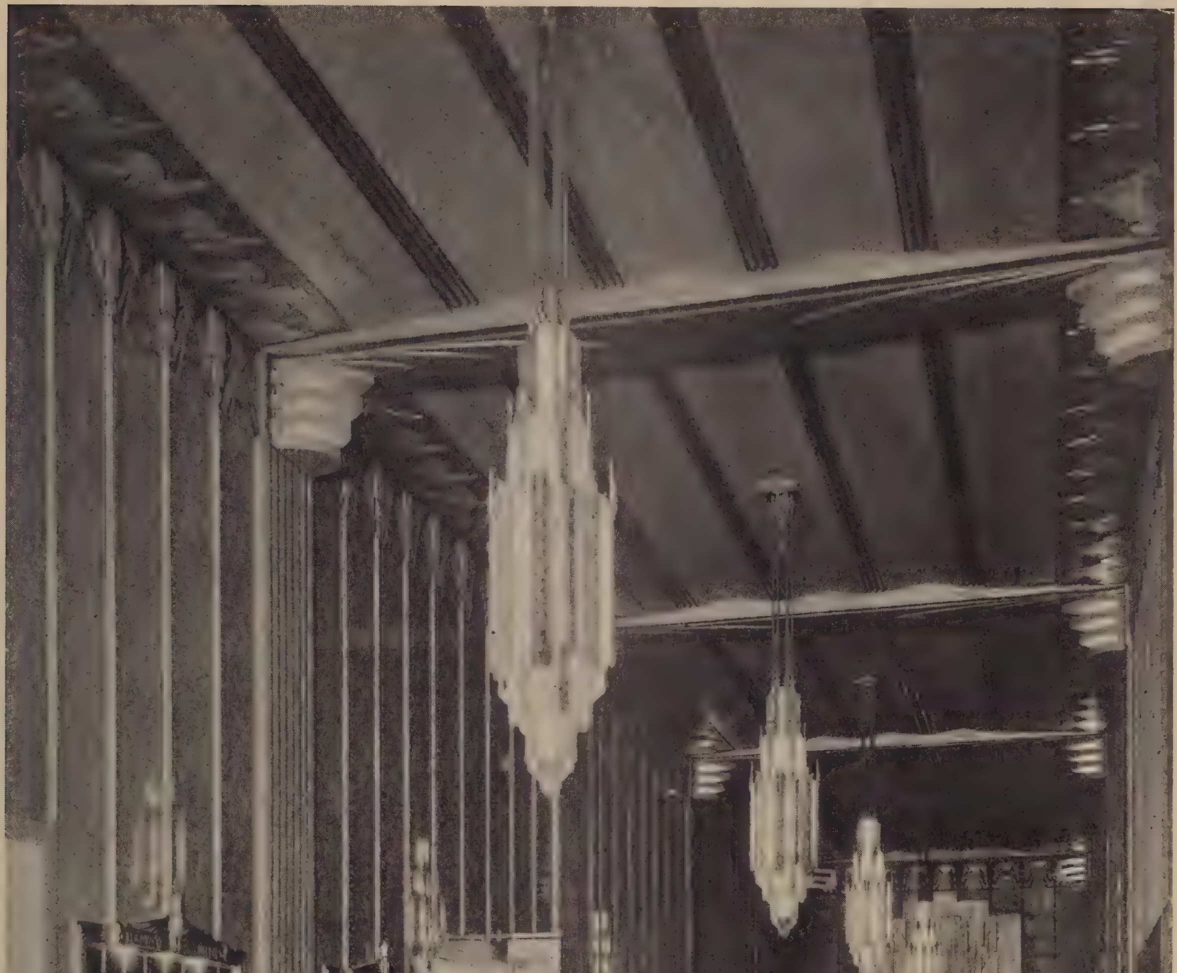


Photos. Albert Rothschild

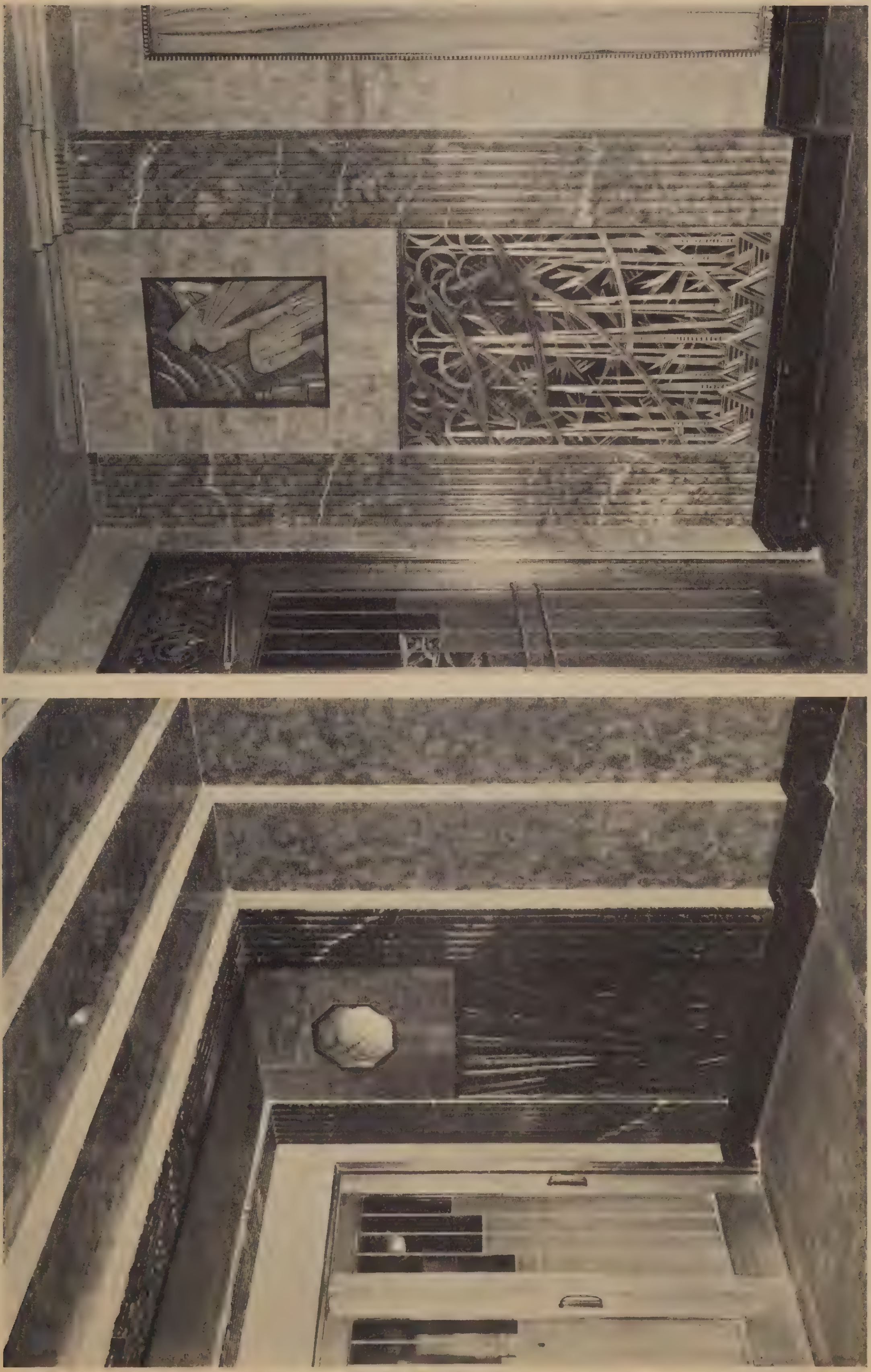
SHOP IN LOBBY

CHANIN BUILDING, NEW YORK

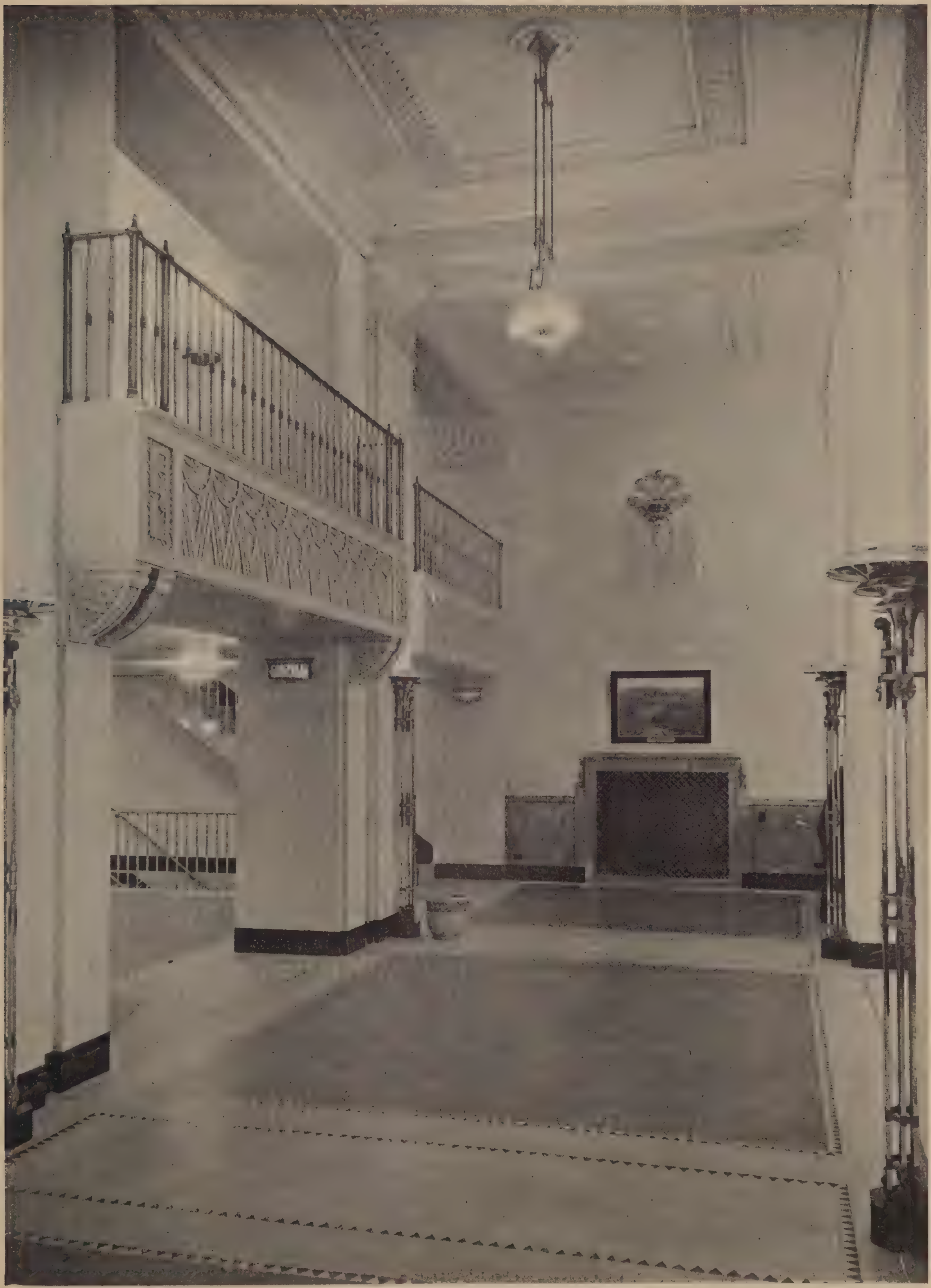
JACQUES DELAMARRE, ARCHITECTURAL DIRECTOR, CHANIN CONSTRUCTION CO., DESIGNER



LOBBY
CHANIN BUILDING, NEW YORK
JACQUES DELAMARRE, ARCHITECTURAL DIRECTOR, CHANIN CONSTRUCTION CO., DESIGNER

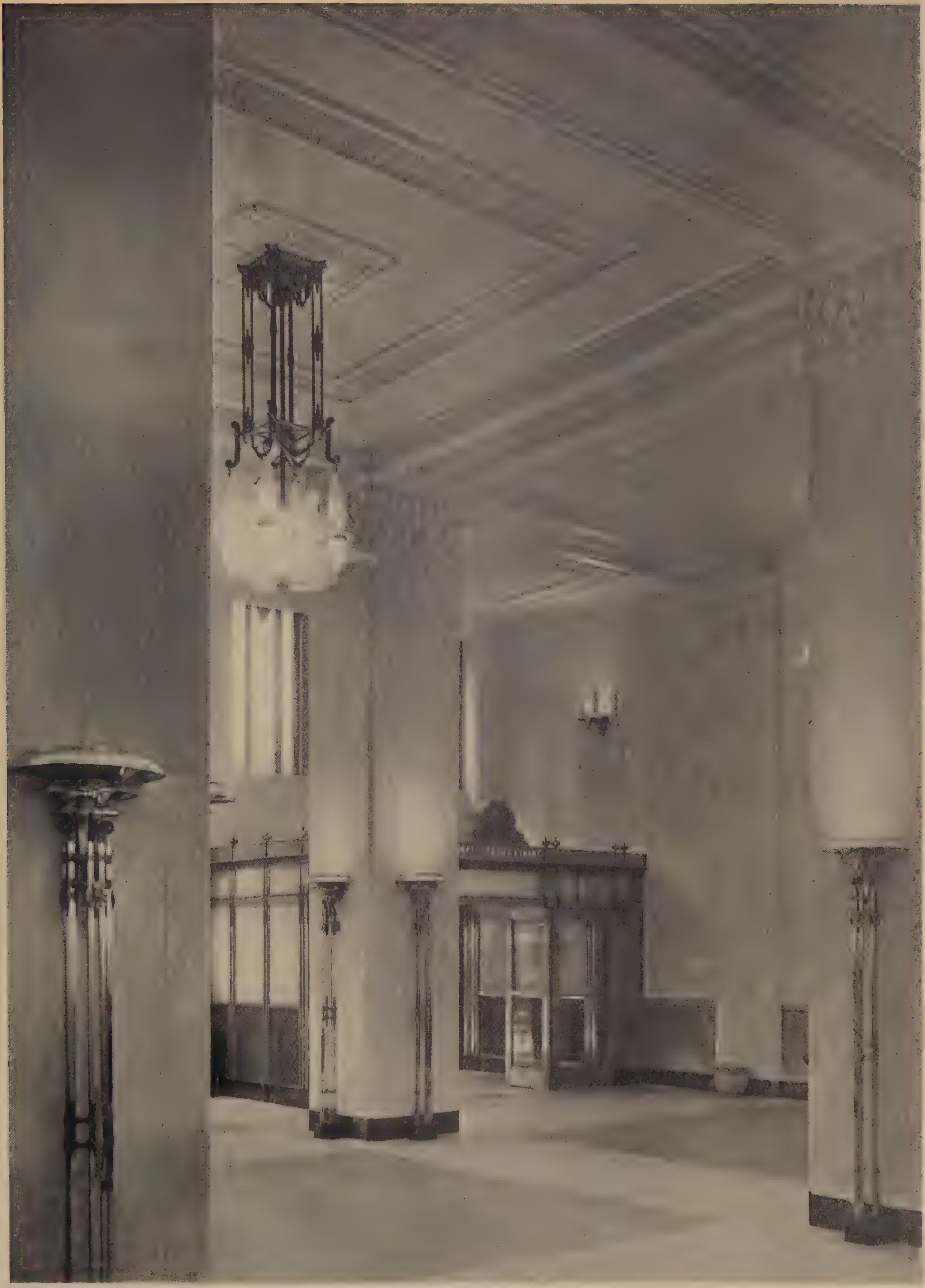


RELIEFS AND GRILLES IN VESTIBULE
CHANIN BUILDING, NEW YORK
JACQUES DELAMARRE, ARCHITECTURAL DIRECTOR. CHANIN CONSTRUCTION CO., DESIGNER

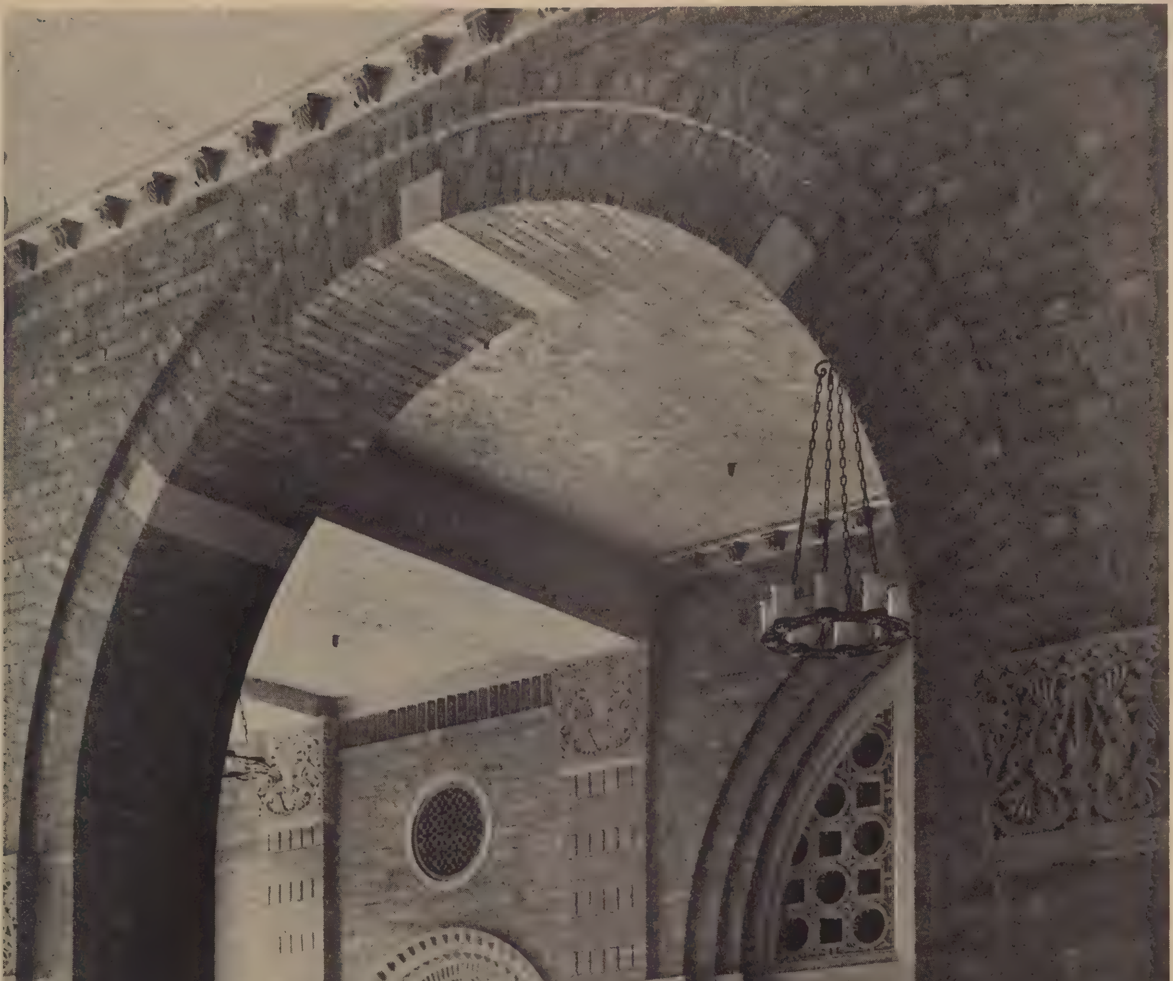


Photos. Samuel H. Gottscho

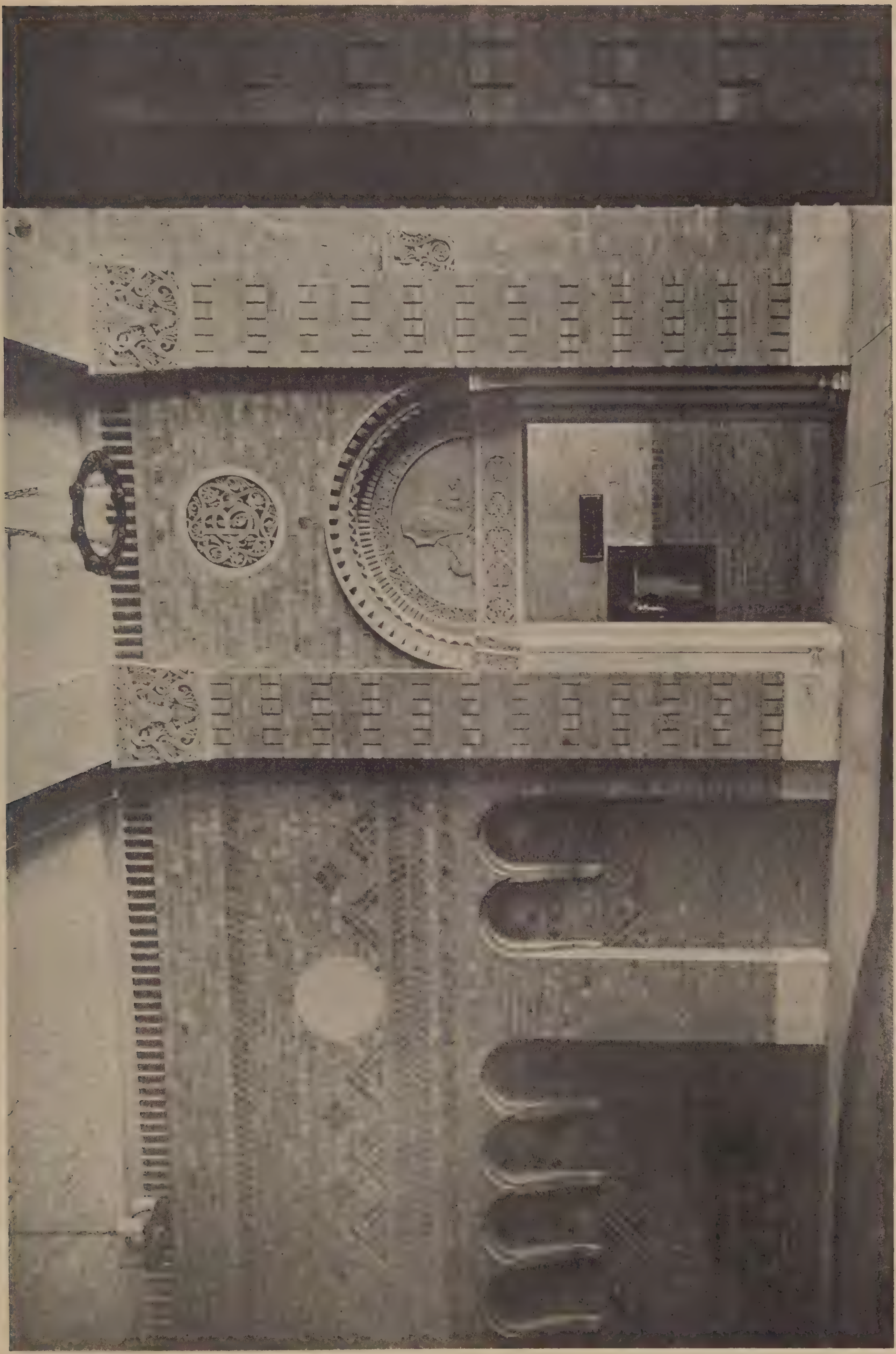
BALTIMORE & OHIO RAILROAD OFFICES
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



BALTIMORE & OHIO RAILROAD OFFICES
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



BALTIMORE & OHIO RAILROAD BUS TERMINAL
CHANIN BUILDING, NEW YORK
SLOAN & ROBERTSON, ARCHITECTS



BALTIMORE & OHIO RAILROAD BUS TERMINAL
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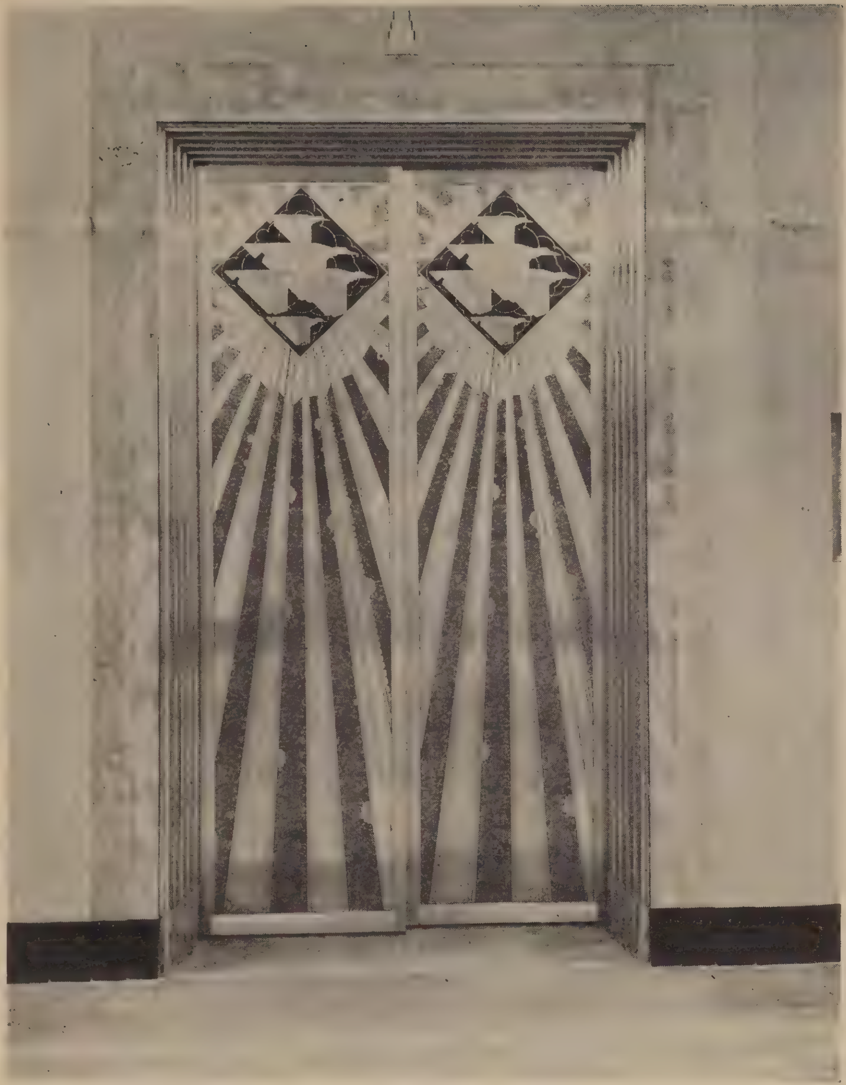
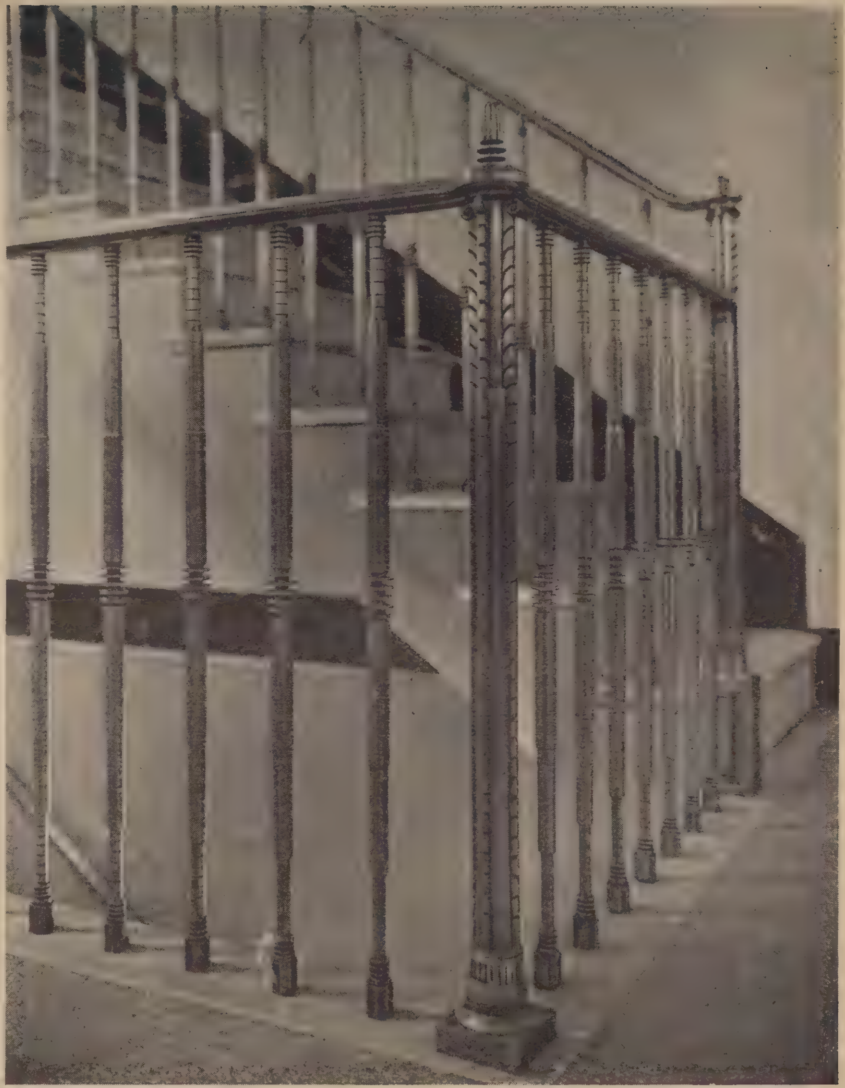


Photo. Albert Rothschild

ELEVATOR DOORS IN LOBBY
JACQUES DELAMARRE, ARCHITECTURAL DIRECTOR
CHANIN CONSTRUCTION CO., DESIGNER



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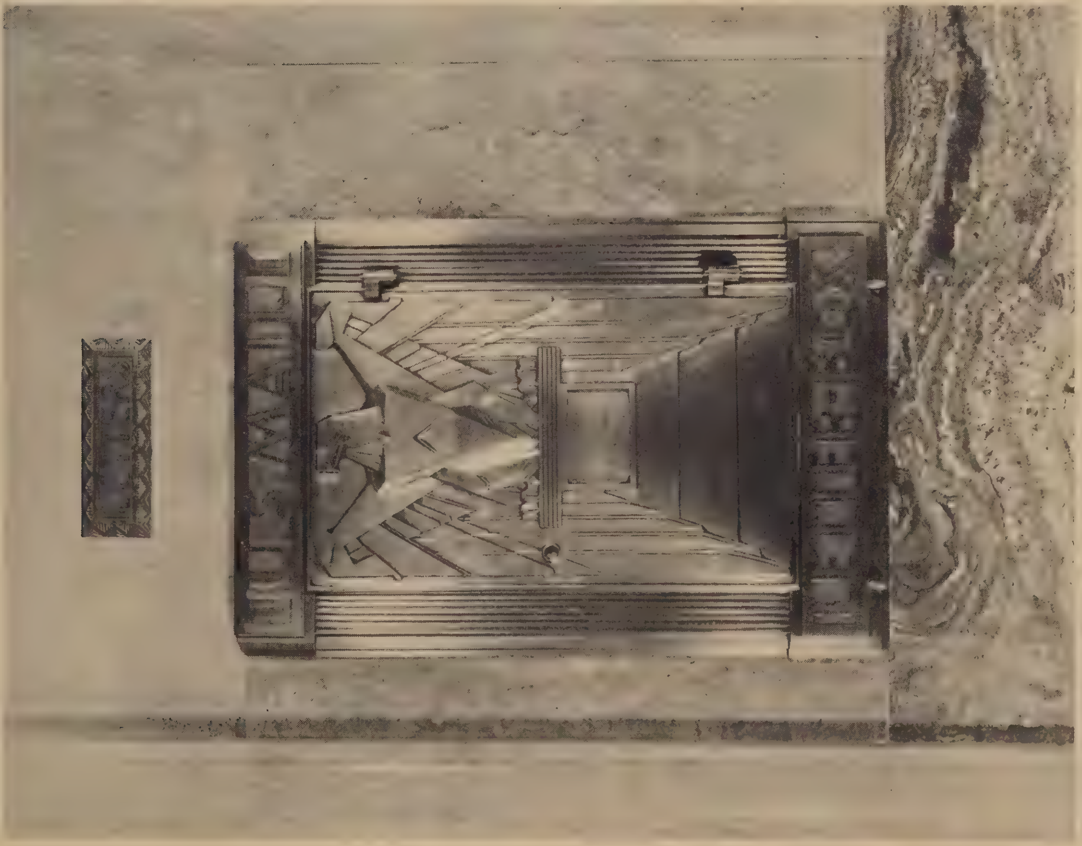
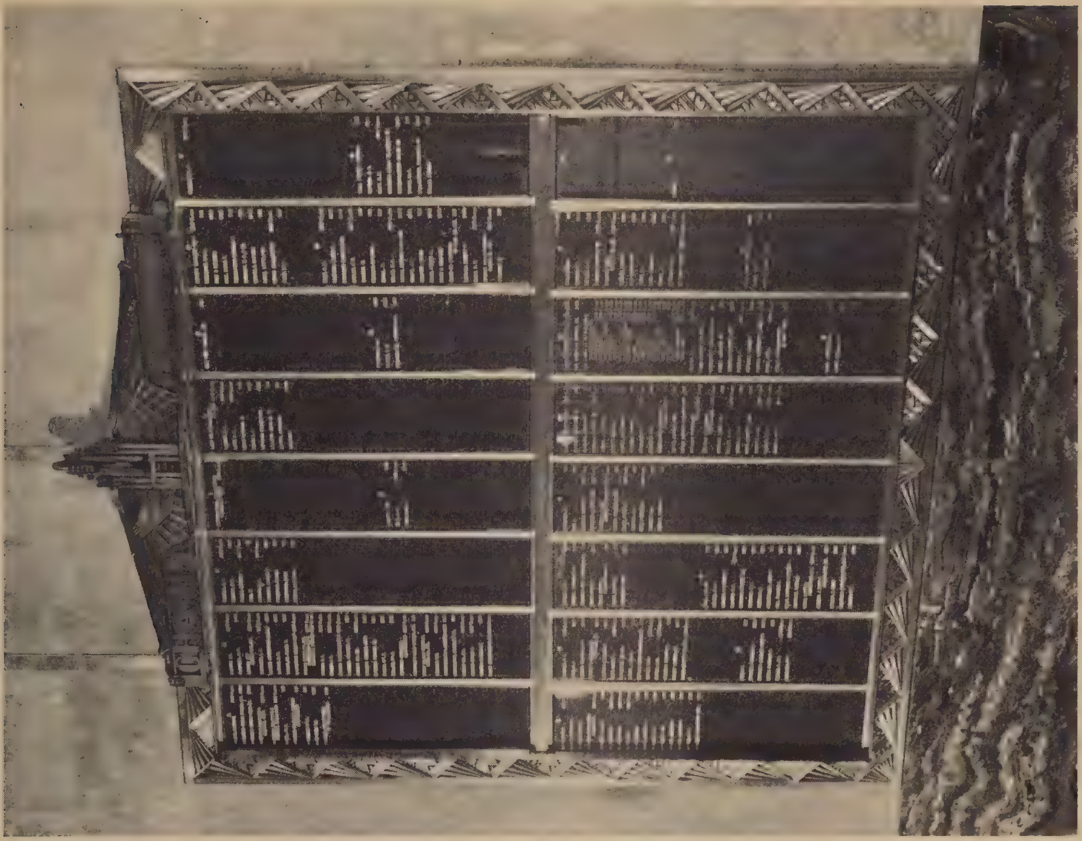


Photos. *Albert Rothschild*

LETTER BOX



DIRECTORY

CHANIN BUILDING, NEW YORK

JACQUES DELAMARRE, ARCHITECTURAL DIRECTOR, CHANIN CONSTRUCTION CO., DESIGNER

TWICKENHAM HOUSE, ABINGDON, BERKS.

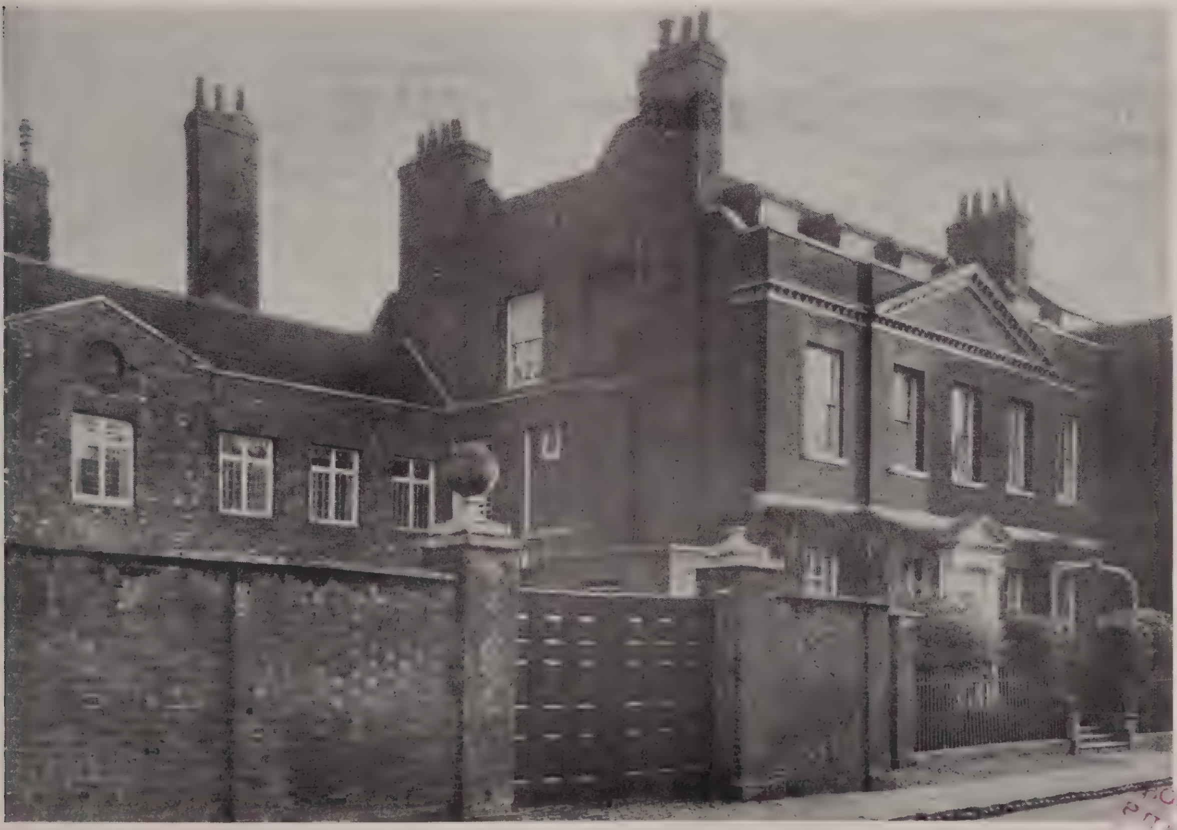
BY

HAROLD DONALDSON EBERLEIN

TWICKENHAM HOUSE, in East St. Helen's Street, at Abingdon, is a very old house, much older than one would fancy from its exterior. As a matter of fact, there are records of the house in Shakespeare's time, and documentary indications are not wanting to show that it was not new even then. Its appearance, however, within as well as without, utterly belies its real age.

Like many other old houses to be found in the towns, villages and open country, throughout the length and breadth of England, Twickenham House wears the livery of the eighteenth century, a garb put on when it had already attained mature years. In its decorous Georgian exterior it bears witness to the great building activity that marked the period when the merchant and professional classes had become prosperous and were able to spend money as never before. Their new prosperity prompted them to remodel their dwellings in the elegant manner of the day, and to surround themselves with material comforts and conveniences that the limitations of older domestic architecture could scarcely yield them; the Classic mode was more closely in accord with the changed manners and wants of the period. Consequently, over and above all the new construction then going forward in town and country, there took place an unprecedented amount of remodeling and refronting. The fashionable process of reconstruction became at times almost a mania, and it often altered the aspects of whole streets. Rows of houses shed their wonted mediæval features and blossomed forth with all the orderly amenities of new Georgian fronts. Internal structure frequently remained untouched, but re-faced exteriors were to be seen on every hand.

Those who could afford to do so did not stop at encasing the outsides of their old houses in new Classic jackets; they extended the rehabilitating program to remodeling and refinishing the interiors, conformably to whatever happened to be the current phase of the approved style; moreover, they often undertook extensive enlargements as parts of the schemes. There was money to spend, and there was a spirit of emulation abroad. Though labor was cheap and money had a relatively greater purchasing power than it has now, not a little of the remodeling was carried out



Twickenham House, Abingdon, Berks.

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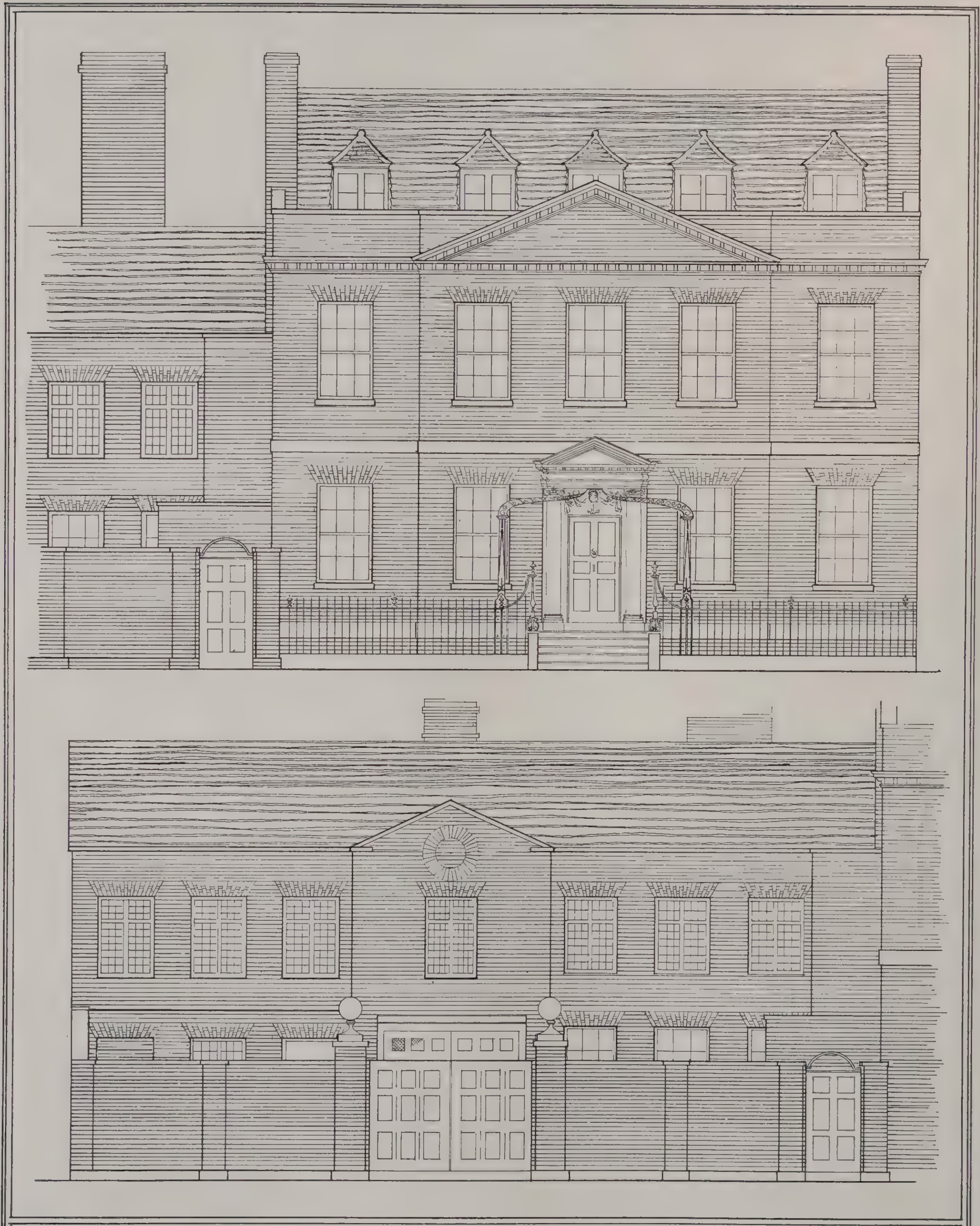
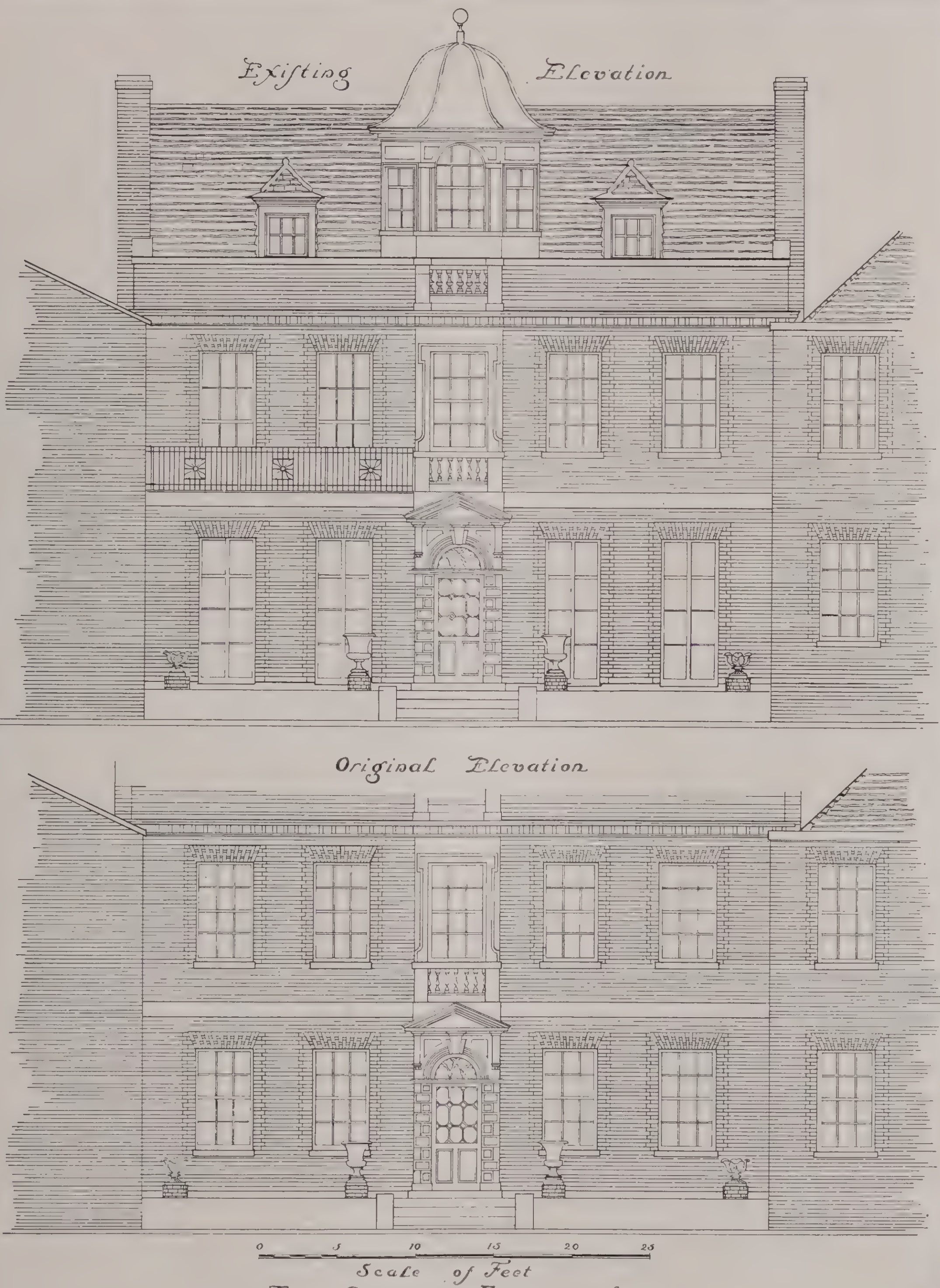


TWICKENHAM HOUSE ~ ABINGDON ~ BERKS

STREET ELEVATION

Scale ~ 1/8" = 1'-0"



The Garden Front of
TWICKENHAM HOUSE ~ ABINGDON BERKS

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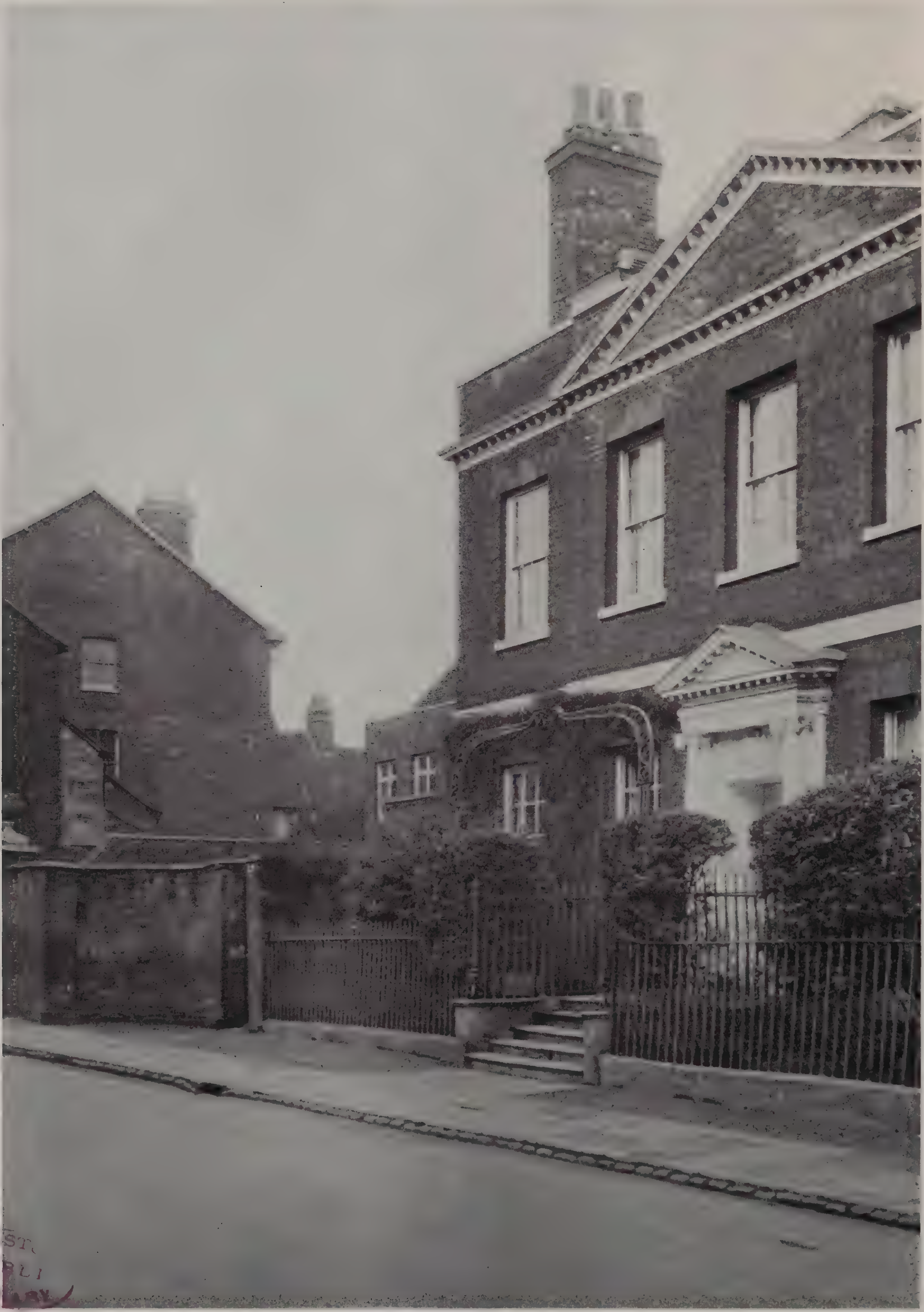
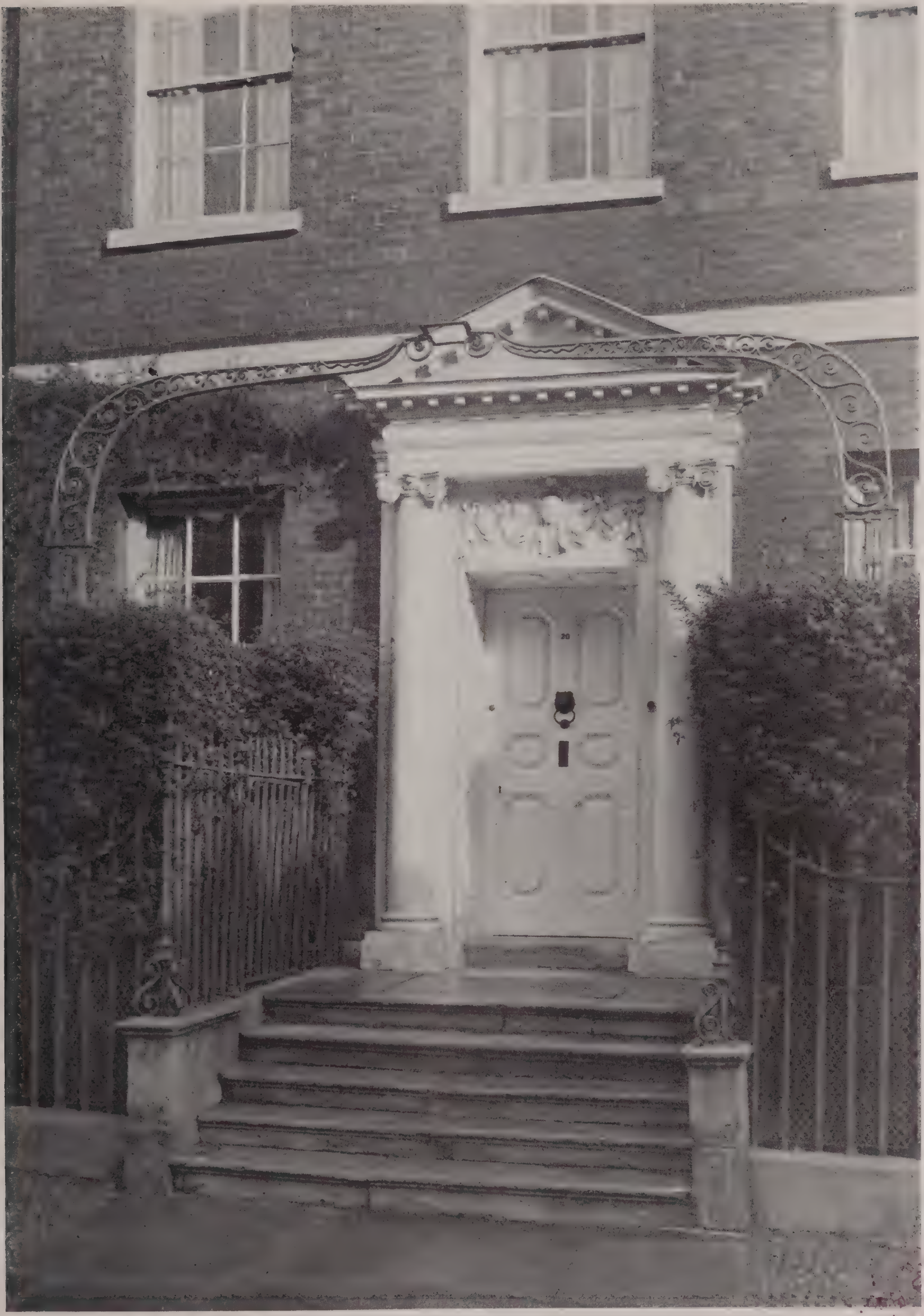
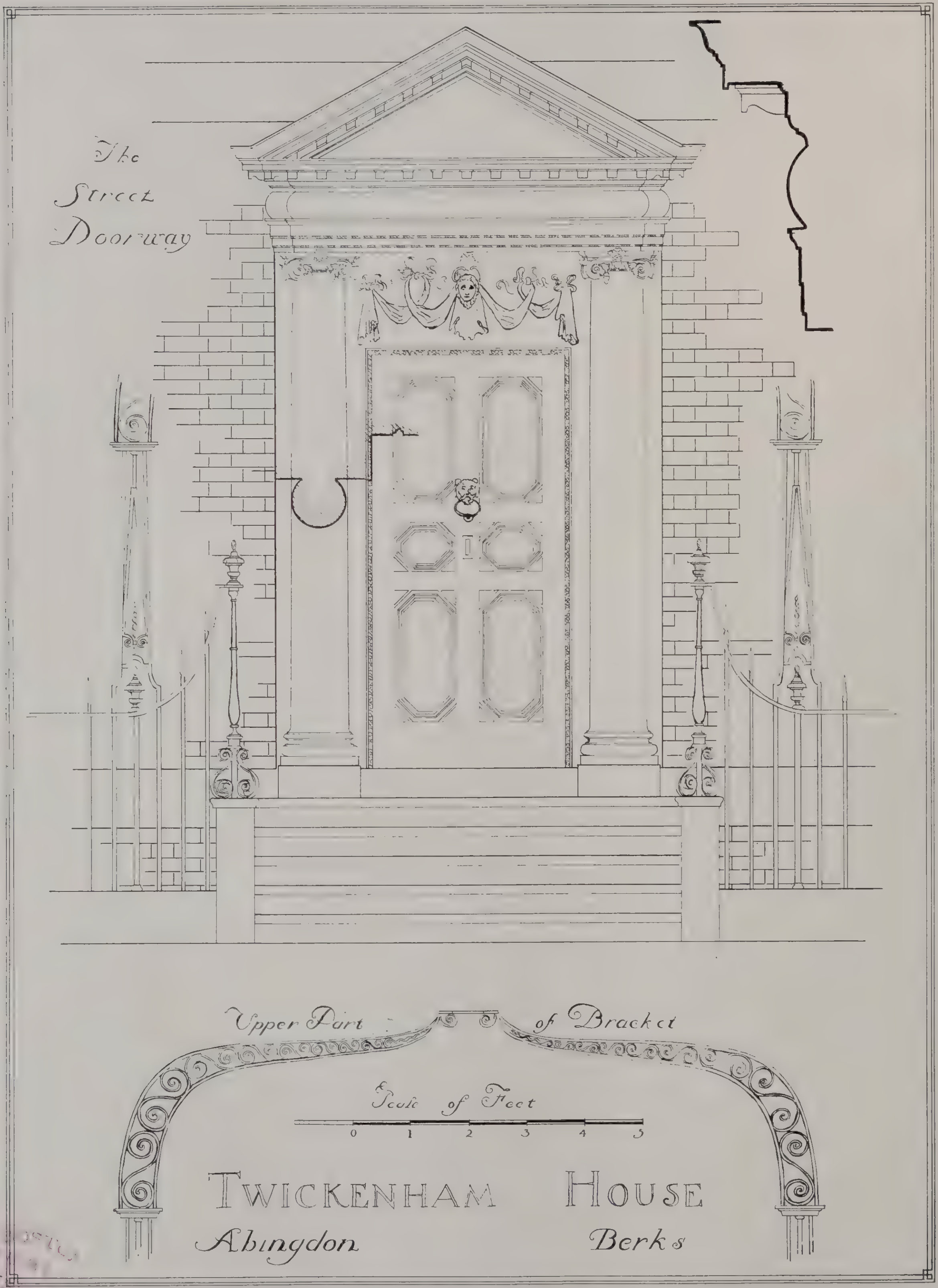
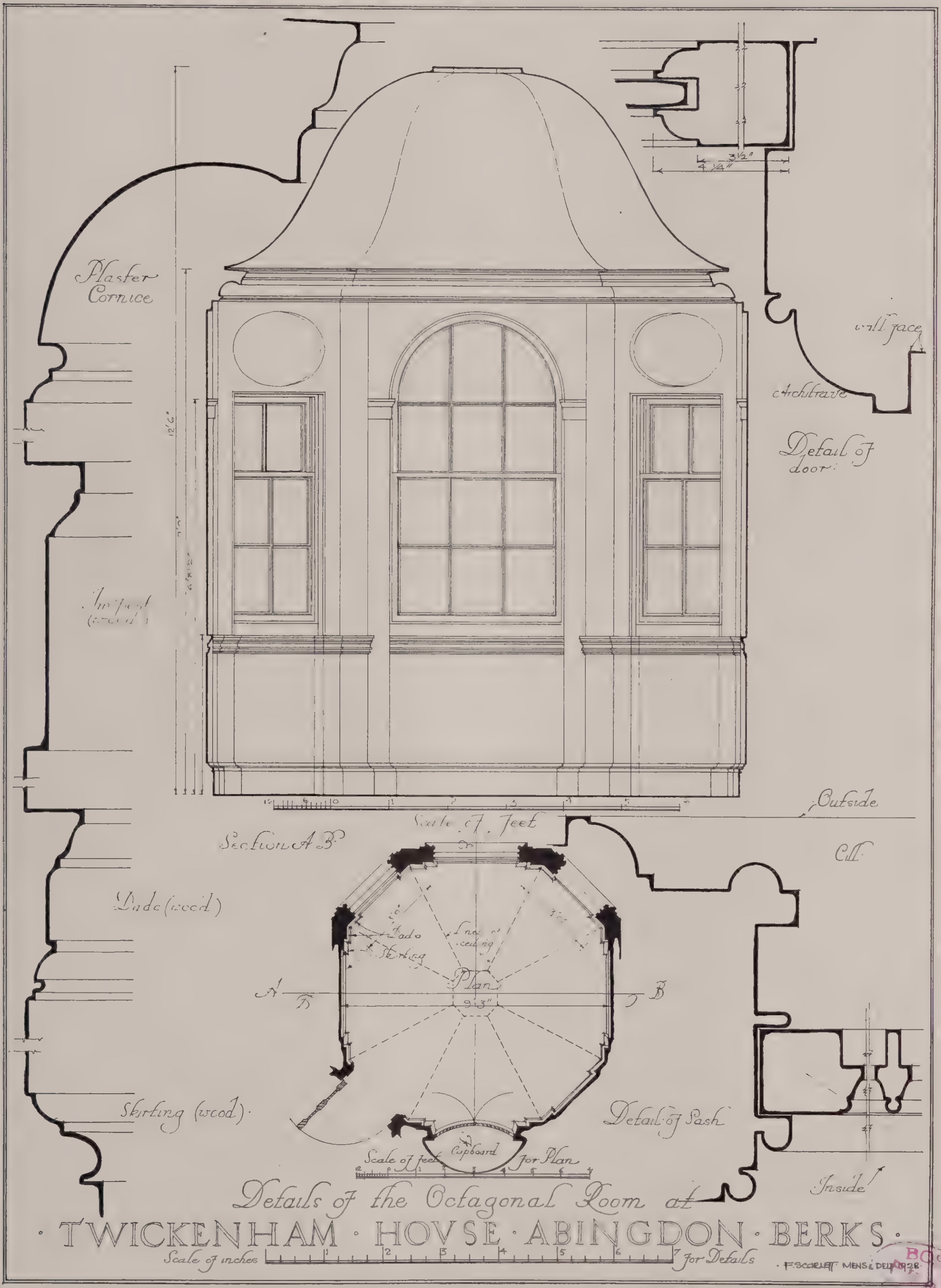


STREET ELEVATION
TWICKENHAM HOUSE, ABINGDON, BERKS.



FRONT DOORWAY
TWICKENHAM HOUSE, ABINGDON, BERKS.


The Street Doorway
Upper Part of Bracket
Scale of Feet
0 1 2 3 4 5
TWICKENHAM HOUSE
Abingdon Berks



Details of the Octagonal Room at
· TWICKENHAM · HOVSE · ABINGDON · BERKS ·

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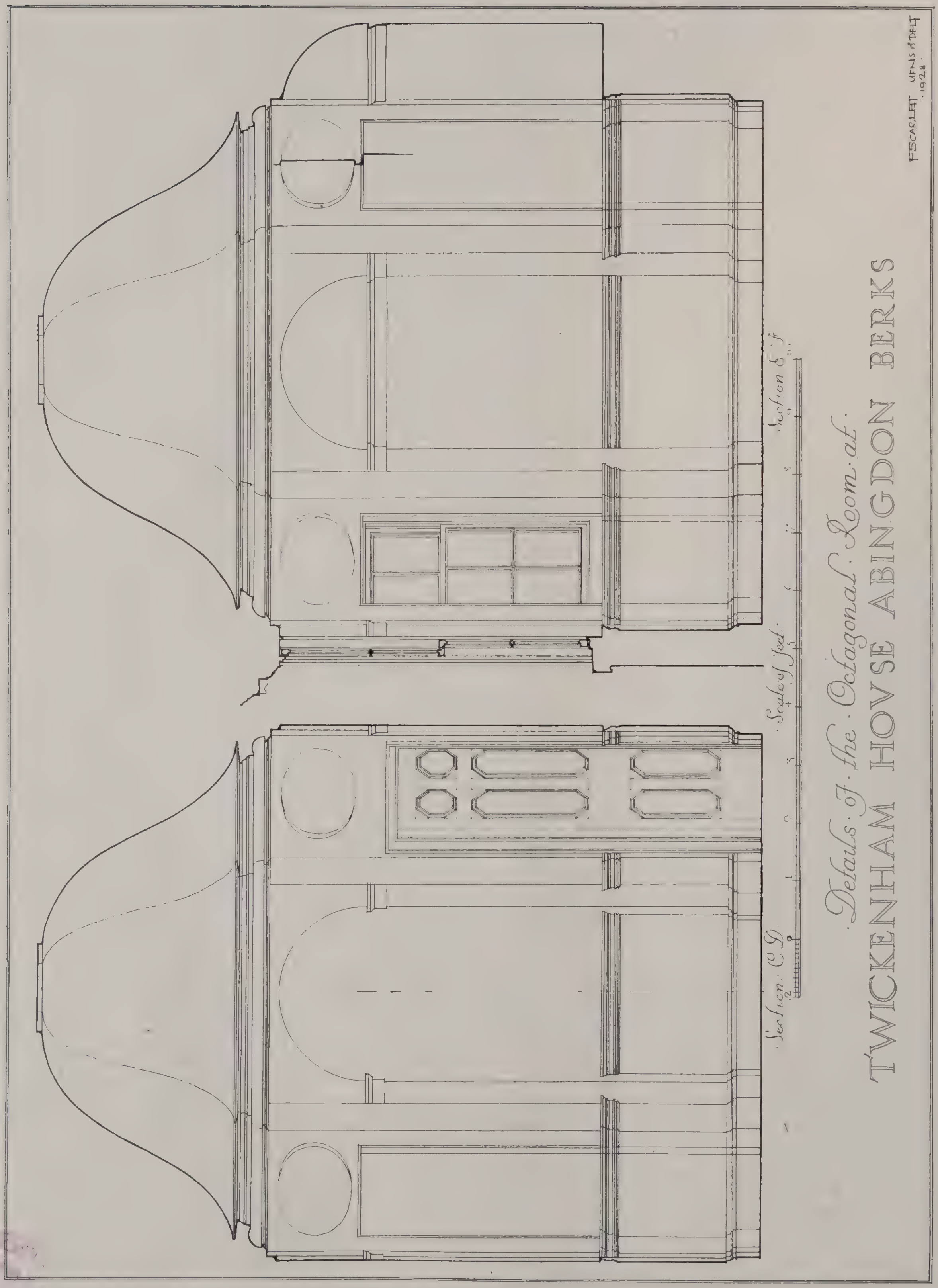
·Details·of·the·Octagonal·Room·at·
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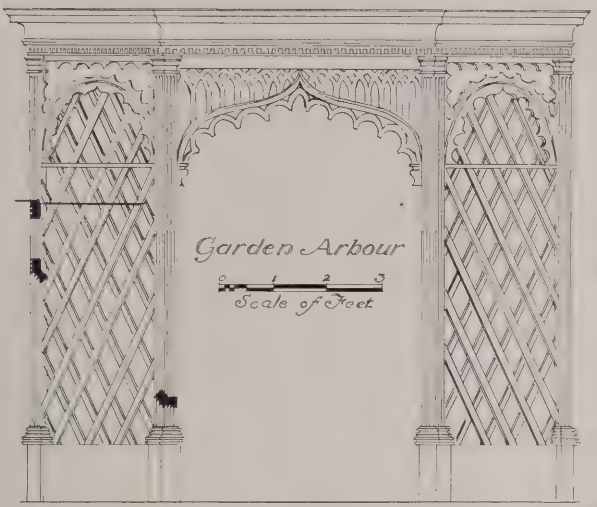
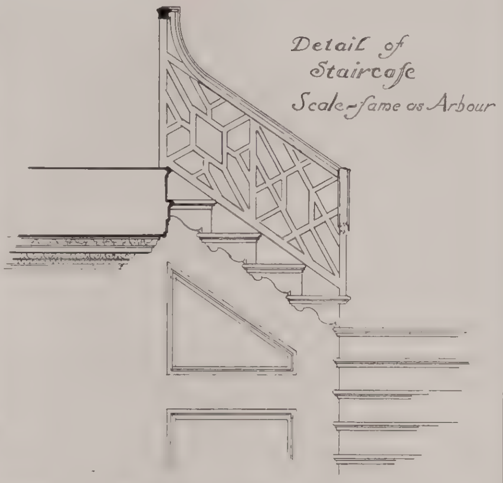
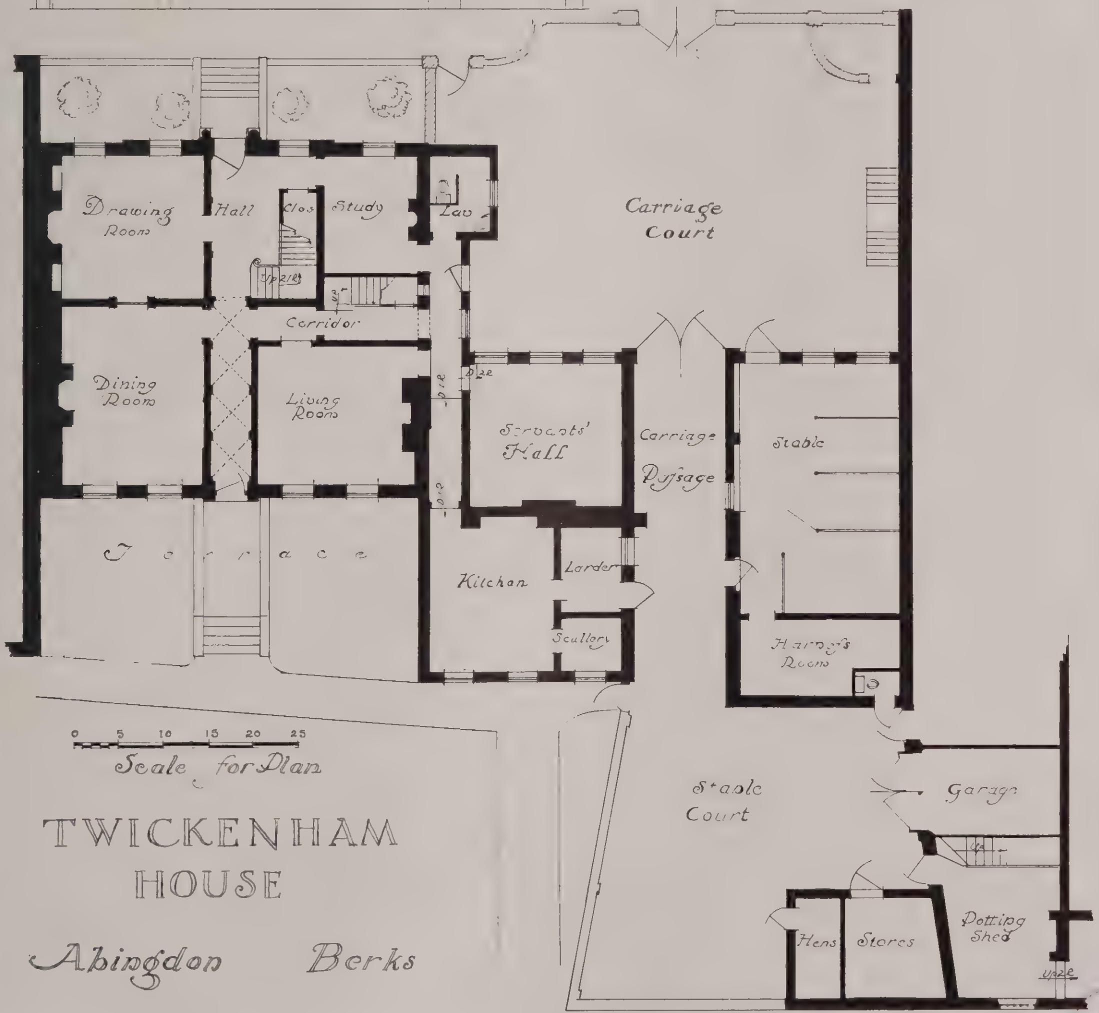
F SCARLETT MENS et DELT ·1928·







TWICKENHAM
HOUSE

Abingdon Berks

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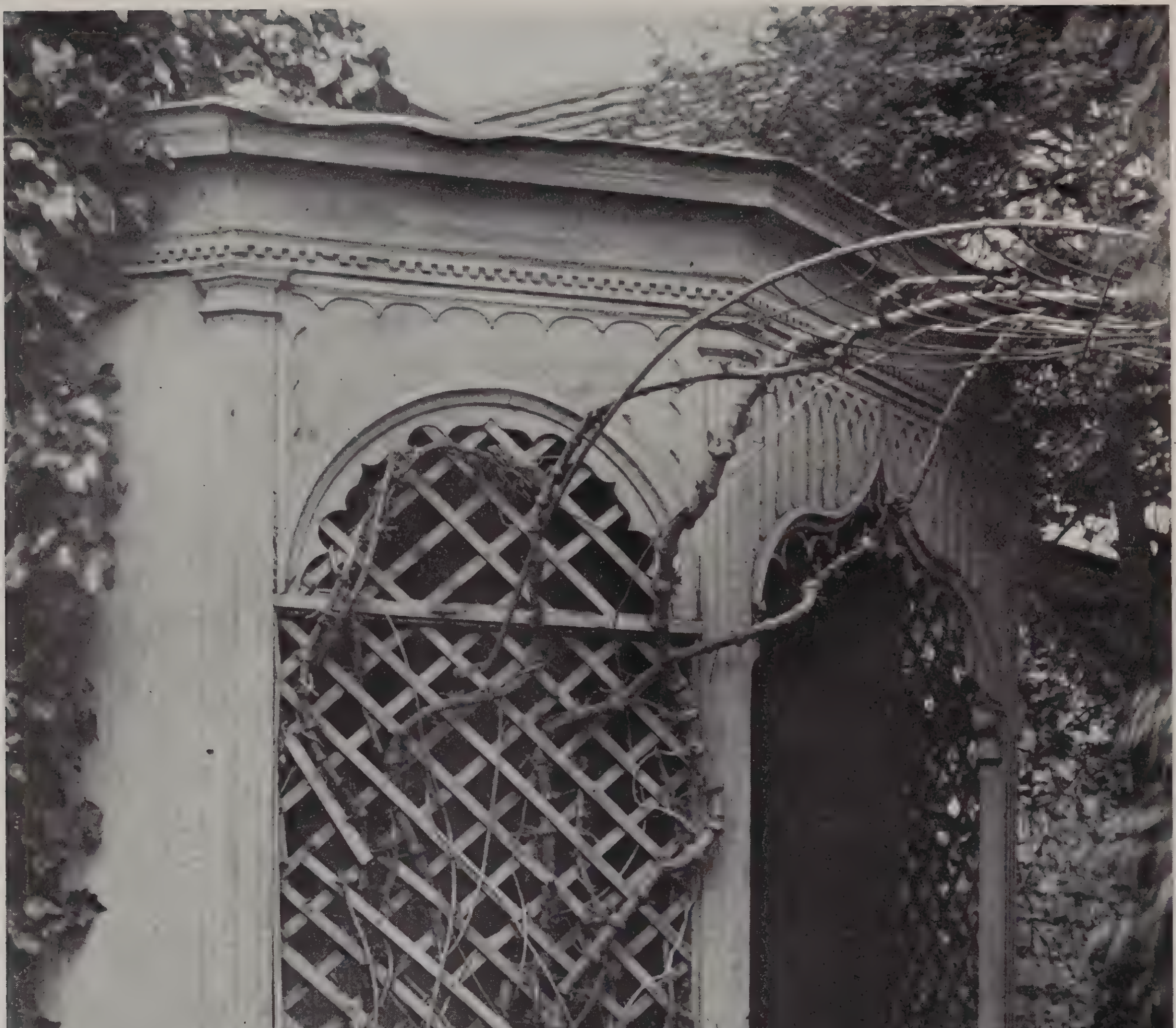
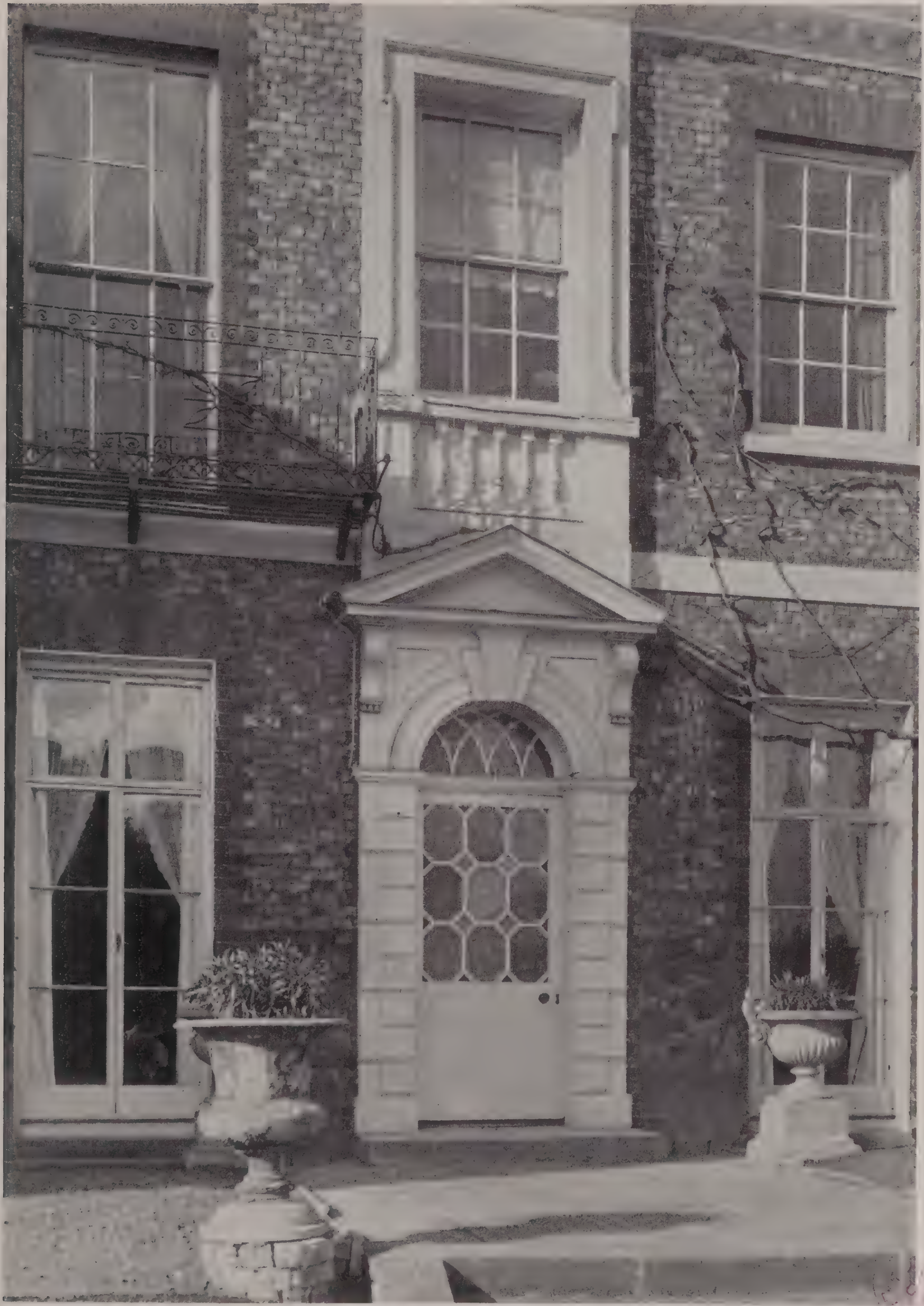
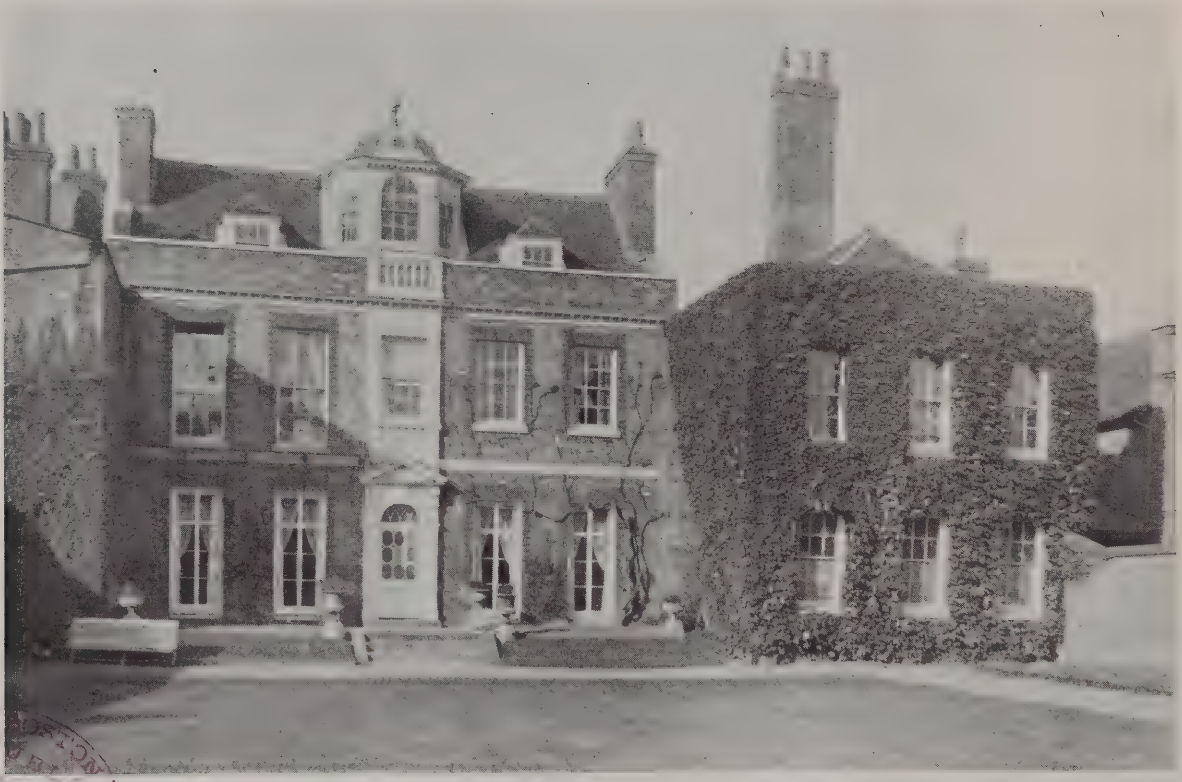


GARDEN ARBOR
TWICKENHAM HOUSE, ABINGDON, BERKS.



GARDEN DOORWAY
TWICKENHAM HOUSE, ABINGDON, BERKS.



Garden Front

at large expense, even when gauged by later standards. Masterly craftsmanship was thoroughly appreciated, and not only desired but demanded. Enthusiasm for the best carving, paneling, decorative plasterwork, wrought iron and gauged brickwork, besides the finest masonry in brick and stone, meant expenditure with unstinted lavishness.

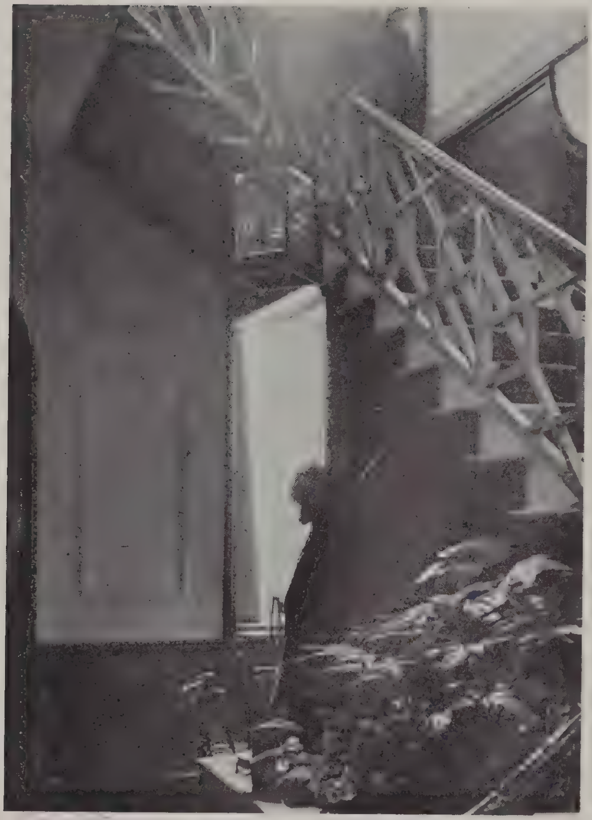
Twickenham House is a typical example of thoroughgoing eighteenth century renewal. So complete was the transformation it underwent that not a vestige of the house's former aspect was left visible. It is only when the walls and timbers are closely examined that the earlier structure comes into evidence. The outer walls,—street front, garden front and north side,—were encased in new brickwork after the best manner of the period; the interior was wholly refinished with equal pains, and every item, both in design and execution, is of the choicest quality. Everywhere, both inside and out, is the unmistakable impress of the eighteenth century. There is a tradition locally current that Inigo Jones designed Twickenham House but, if that great English Palladian ever had anything to do with it, all traces of his connection have vanished. The manner is that of many years after Jones was gathered to his fathers.

Unlike the majority of houses that were remodeled and refaced during the era of Georgian renewals, Twickenham House reveals plain evidence of having passed through several successive phases of alteration, although the greater part of the work indubitably belongs to the mid-eighteenth century. This fact does not in the least lessen the building's charm. On the contrary, all the features are so extremely good, and the items of different dates are so admirably blended, that the composite result gains a piquancy not always attaching to fabrics cast in their final form at one time. A somewhat unusual feature of the plan is the presence of two courts,—the outer or carriage court, and the inner or stable court. In the outer court is the old mounting block with a kennel for the watchdog beneath. Inside the house, various things happened during the process of reconstruction to bring the arrangement into conformity with the ordered regularity of Classic plan. The main body of the house is virtually square in plan, and on the ground floor there are the drawing room, dining room, living room, study, stair hall and corridors; the servants' hall, kitchen and domestic offices are in part of the north wing back of the carriage court. Above stairs the plan follows the same general scheme as below, the servants' quarters being in the upper story of the wing. The east front of the house fronts upon a terrace overlooking the garden which extends all the way down to the Thames; the stable court wall and the continuing greenhouses (not shown on the accompanying plan) give a shelter on the north and afford a "sun trap." The west or street front is of red

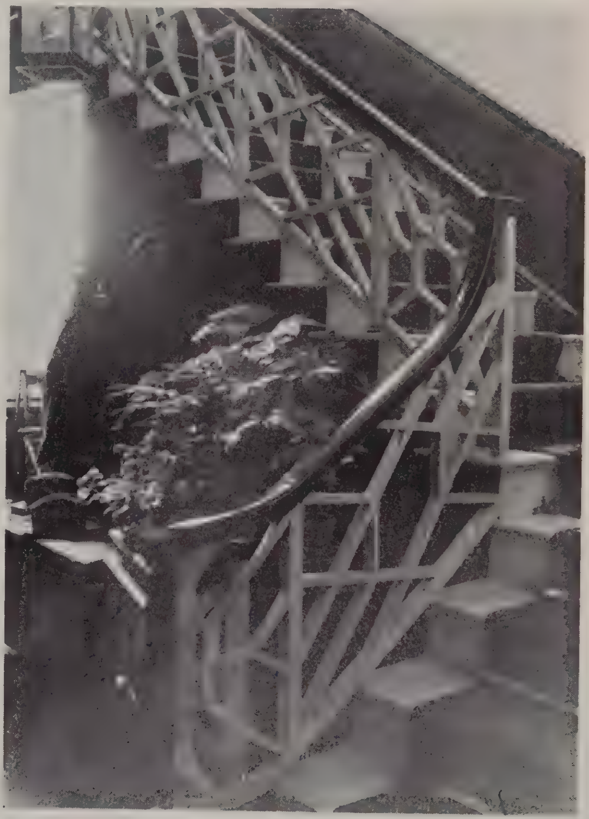
Stable Court

brick with limestone trimmings, and the splayed lintels above the windows are of rubbed brick. The cornice, be it noted, is of stone. Brick with a blue-gray, half-vitreous surface, once quite commonly used in the neighborhood, appears on the east or garden front, but the lintels above the windows and likewise the sides of the openings are defined with red brick, thus imparting a very agreeable color interest to the elevation. The roofs are covered with small red flat tiles.

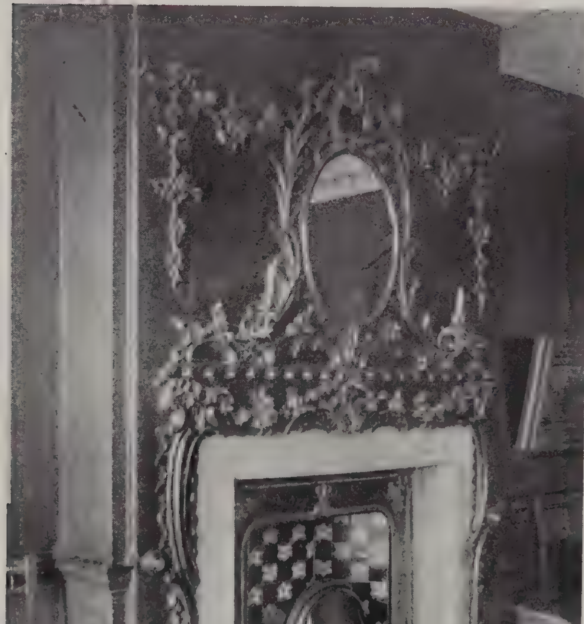
An exceptionally pleasant feature of the garden elevation is the octagonal half-cupola, one side of which goes into the slope of the roof. This was obviously added at the close of the eighteenth century, as we may see by the evidence of the accompanying plates of drawings which show the exquisite refinement and delicate proportions of moulding profiles in vogue at that period. It was about the same time that the living room and dining room windows were cut down to the ground and fitted with two-leaved glass doors, in the French manner. It was also at this period that the windows of the south bedroom, above the dining room, were cut down to the floor and the iron balcony added outside them. In the dining room there is an exceptionally fine Rococo chimneypiece. The carving is elaborate and exquisitely wrought, but it will be seen that the proportions of the intricate details are somewhat more substantial than was ordinarily the case with contemporary work of this sort in France. Apart from the chimneypiece and excellent paneling, the dining room is further distinguished by its three door casings of two types, one of which is shown in the plates. The door casings in the hall, too, are of an unusually interesting type and in their design plainly show influence derived from a French precedent of the late seventeenth century. The top *motif* is strongly reminiscent of treatments employed by the great French architects of the Grand Monarch's time. The detail of these doorways in the hall appears in one of the plates that also shows the arcading on the south wall of the entrance and stair hall, on the opposite side from the staircase. One of the most engaging features of the interior is the little vaulted corridor of four bays leading from the back of the stair hall to the garden door and the terrace. It has all the grace and distinction attaching to its Italian Renaissance prototypes. The customary proportions, diminished to accord with the scale of the house, have lost none of their elegance of *ensemble* in the course of translation to fit a Georgian interior of modest size and character. It is another example of how English architecture has always profited by contact with Italian precedent, making it peculiarly its own and stamping it with a strongly national quality.



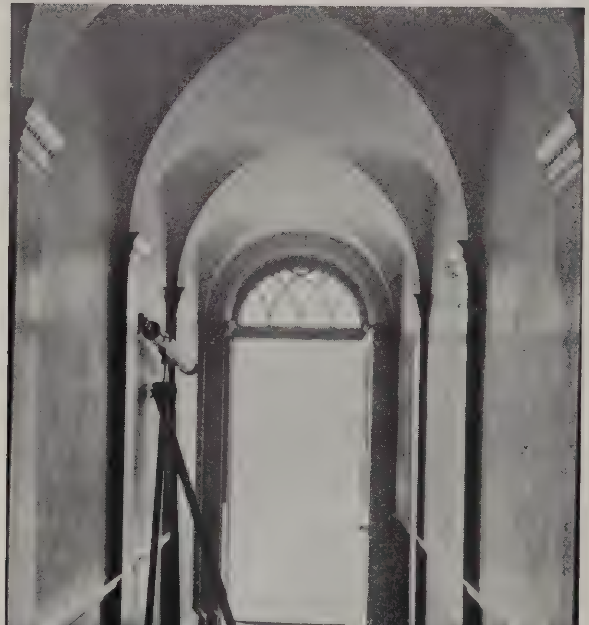
UPPER PART OF STAIRWAY



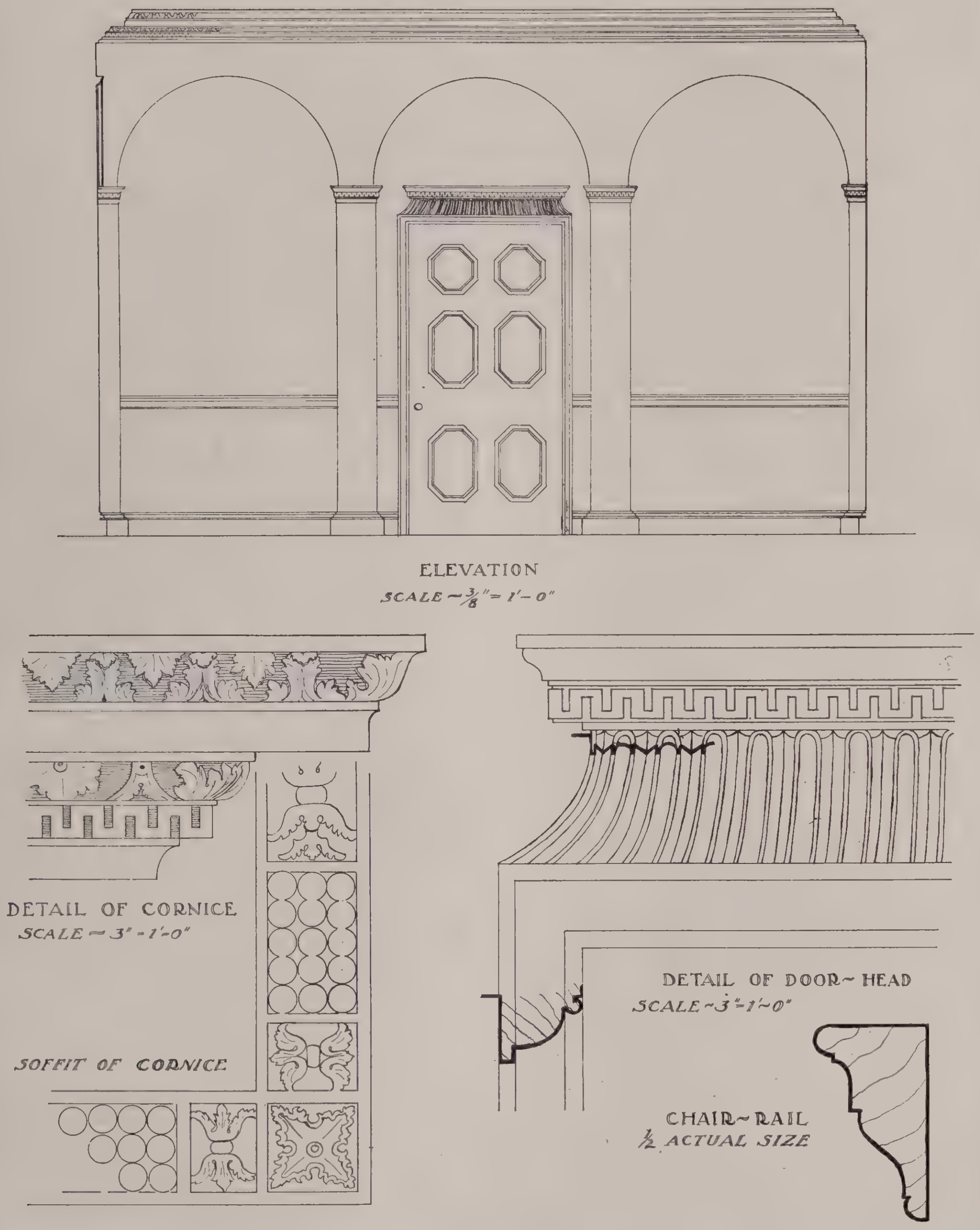
LOWER PART OF STAIRWAY



CHIMNEYPIECE IN DINING ROOM



CORRIDOR TO GARDEN TERRACE



TWICKENHAM HOUSE

ABINGDON Entrance Hall Arcade BERKS

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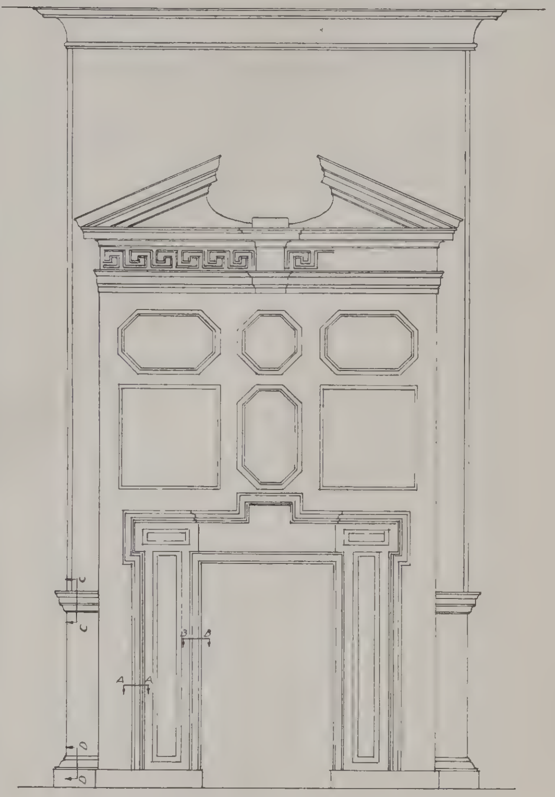
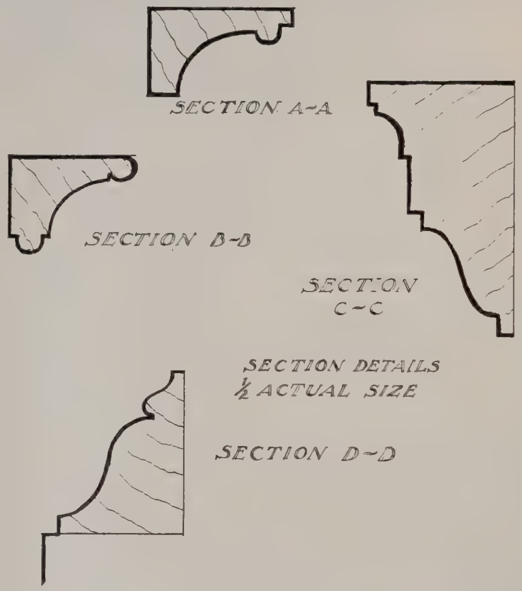
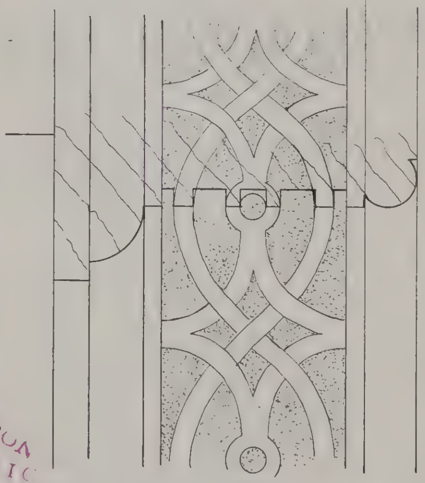


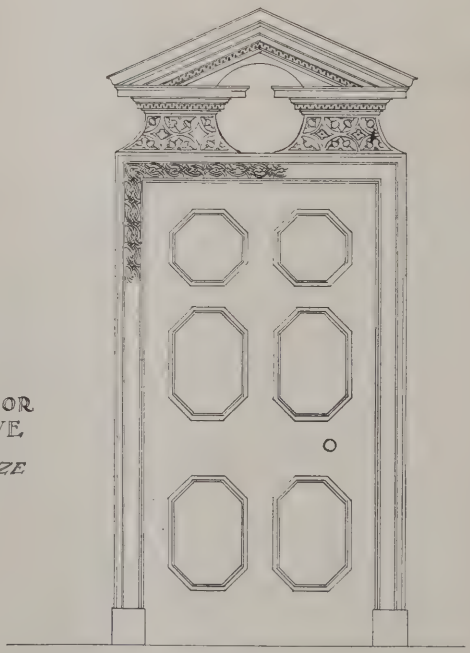
ELEVATION OF STUDY FIREPLACE
SCALE ~ ½" = 1'-0"



SECTION DETAILS
½ ACTUAL SIZE



DETAIL OF DOOR ARCHITRAVE
½ ACTUAL SIZE



ELEVATION ~ DINING RM. DOOR
SCALE ~ ½" = 1'-0"

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TWICKENHAM HOUSE ~ ABINGDON ~ BERKS
FIREPLACE IN STUDY AND DINING ROOM DOOR ~

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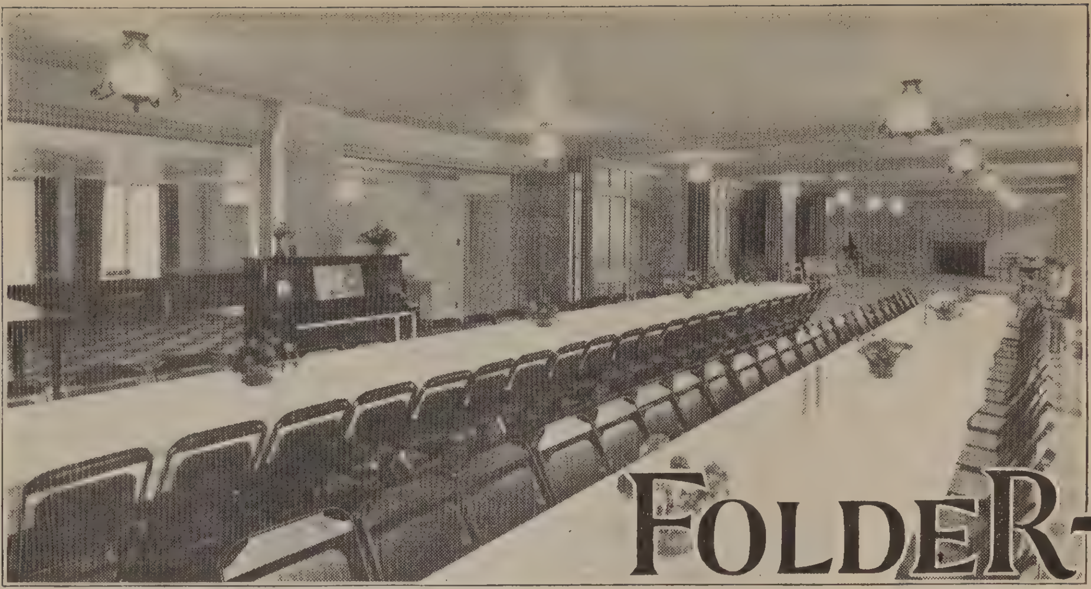

FOLDER-WAY
utilizes idle floor space

Several small rooms quickly converted into one large assembly hall

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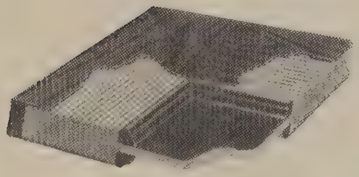

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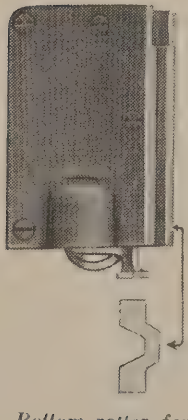
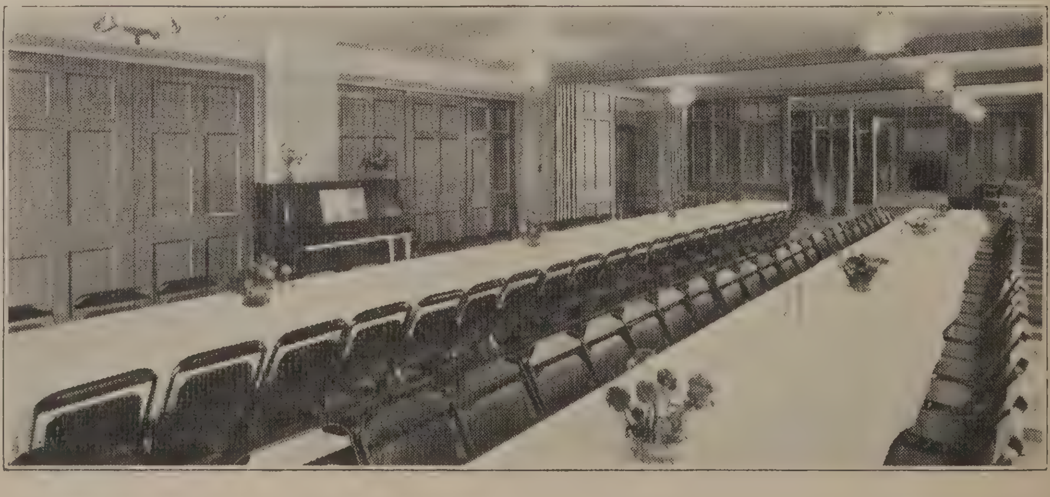
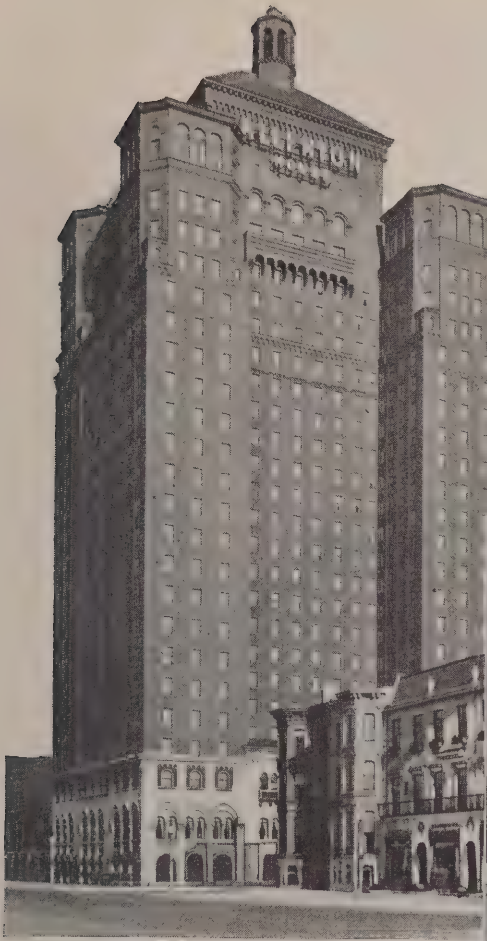


Bottom roller for FoldeR-Way doors, beautiful brass finish or dull black.



ALLERTON HOUSE
(CHICAGO)
adopts the new
RCA
CENTRALIZED RADIO



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2 Centralized radio receiving equipment to distribute broadcast programs to as many as 3000 rooms throughout a building. Equipment may be installed to transmit a single program, or to make available the choice of programs from two, three or four broadcasting stations.

The first method is ideally adapted for apartment houses, dormitories, office buildings, etc., where tenants desire to have their own receiving sets. It does away with the unsightly multiplicity of individual aerials, and the inconvenience of connecting them with distant rooms.

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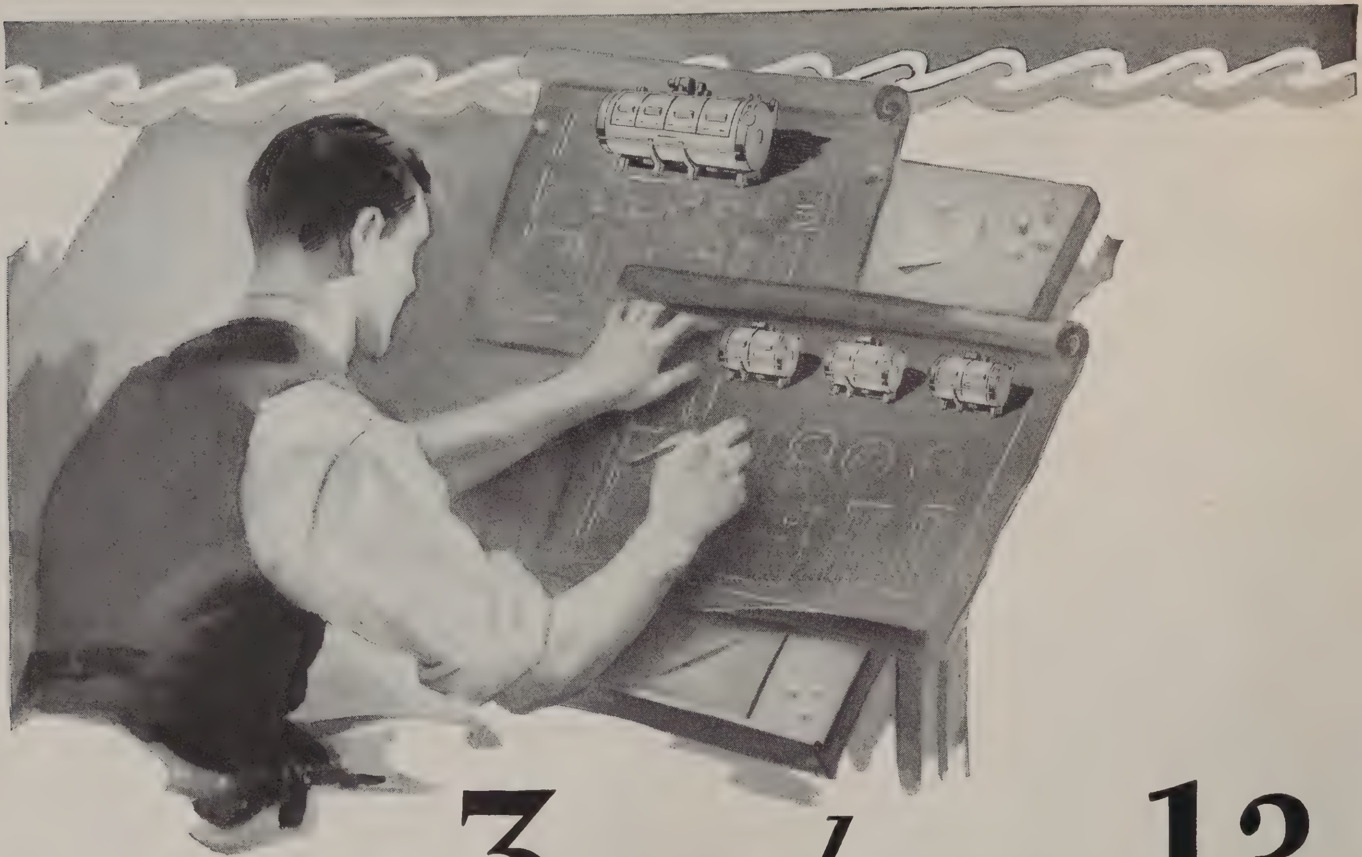

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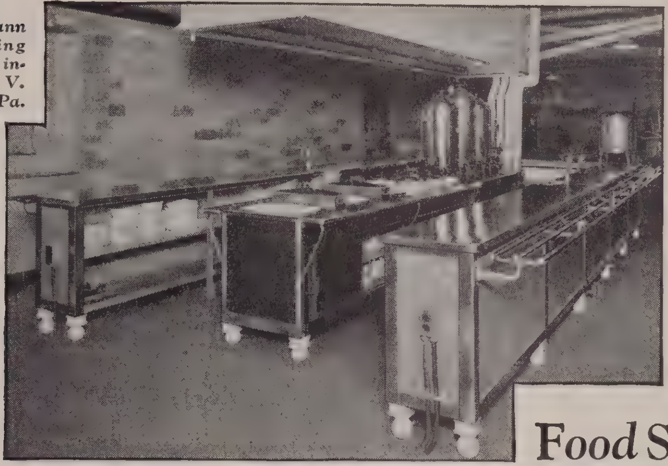

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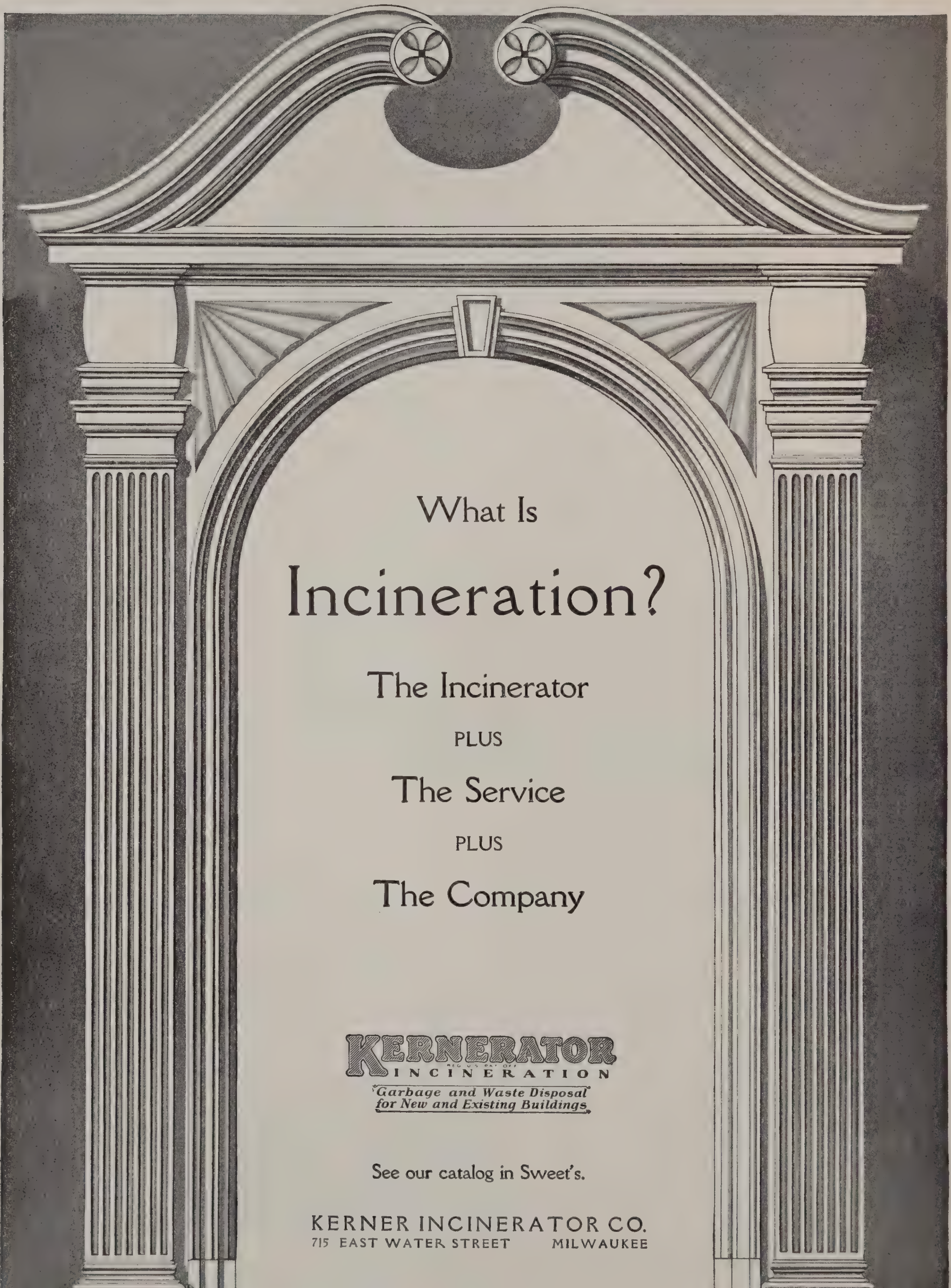

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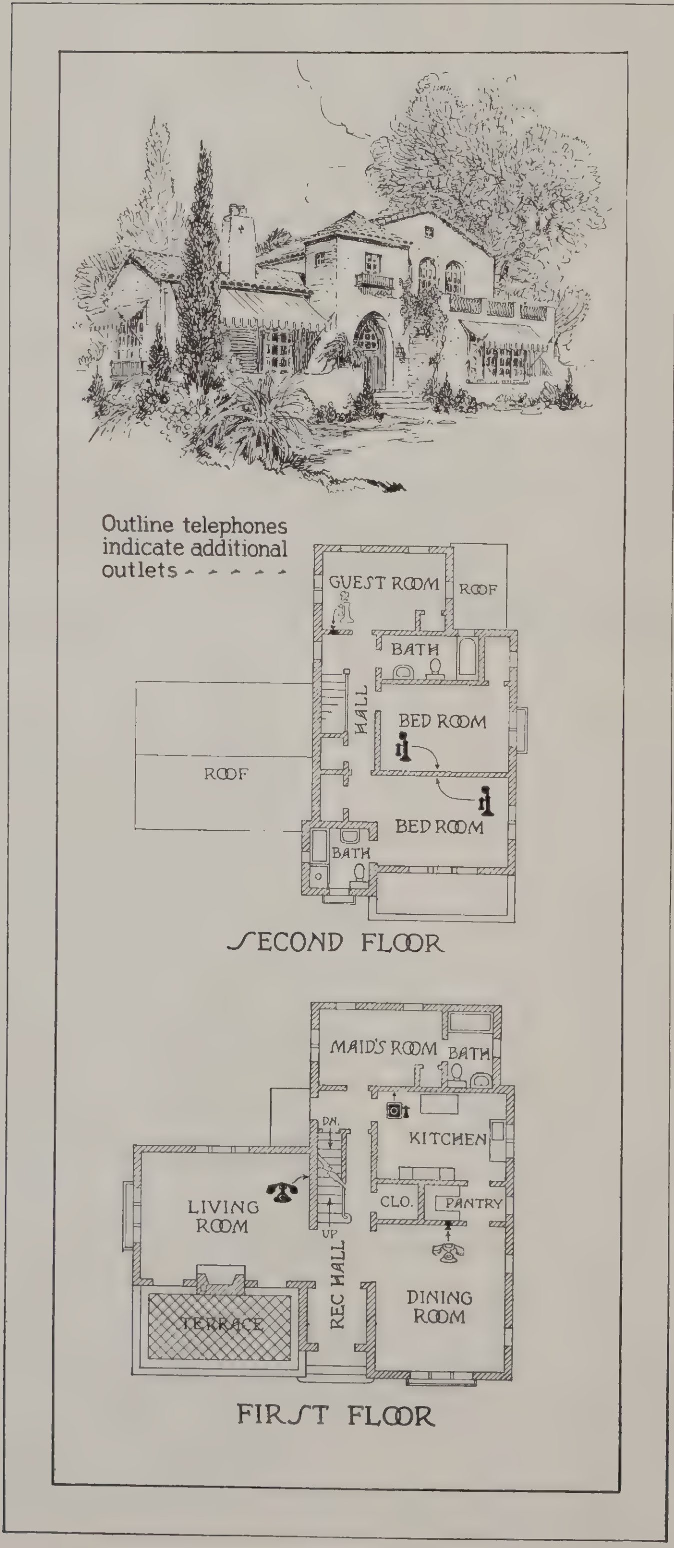

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THE LIFE AND WORK OF AN EARLY AMERICAN ARCHITECT

A REVIEW BY

CLIFFORD WAYNE SPENCER

IN the forward march of progress, many things of real worth and beauty are thoughtlessly trampled under foot and forgotten. This is especially true in the case of architecture. Buildings which are representative of the best in their respective periods must be torn down and carted away to make room for some great, ugly structure for economic reasons, or because of the egotism which leads people to believe that that which is not new and up-to-date is not to be desired. This does not apply exclusively to the present craze for modern art, since every age has boasted of its splendid modern art and architecture and gone about replacing architectural gems with monstrosities in whatever fashion happened to be prevalent at the time. We do not contend that such progress is an unnecessary or undesirable thing, but it seems a pity that some permanent record of the lives and work of our great architects cannot be made before it is too late. Their buildings are demolished or "altered and made ugly," and the few records bearing on their lives and work are scattered and lost, so that in some instances not even a memory remains of men who have played important parts in the development of their country. A very great service is rendered to posterity by those who at great expense of time and labor, make long investigations and consult obscure records and documents in order that the general reader may be able to know what manner of men these were and what were the conditions under which they worked. Thus Edward W. Root, a son of Elihu Root, and a lecturer on art at Hamilton College, has performed such a service in publishing his volume on the life and work of Philip Hooker, one of the earliest architects to practice in this country.

Any book reviewed or advertised in THE ARCHITECTURAL FORUM will be supplied to subscribers at the published price. A remittance for the advertised price must accompany each order. Books so ordered are not returnable.

Hooker arrived in Albany from Massachusetts, at the age of ten, in about 1772. Upon reaching maturity he became a surveyor and also a builder. The latter activity, carried on over a period of 25 years and augmented by a "long and diligent investigation of ancient and modern architecture" of that time, enabled him to become the outstanding architect of his period for the section in and around Albany, and one of the foremost architects in the republic. Like that of many other old American towns, the architectural history of Albany has developed in several successive stages. Starting with the mediæval Dutch cottages, of which the first settlement consisted entirely, Albany received a great influx of settlers from New England in the period following the Revolution. Many of these pioneers remained in Albany and, as was natural, soon began to transform it from a primitive Dutch settlement, with its rows of steep roofed cottages built end-on to the streets, into an almost typical New England village. It was this period of rebuilding and enlargement that gave Philip Hooker his opportunity, and his work became so popular that at one time practically every important public building and many of Albany's finer private residences had been built "agreeable to his designs." Of the early Dutch architecture nothing remains at the present time, although its influence can undoubtedly be traced in many buildings still in existence. The work of the New England settlers has been scarcely more fortunate, and of it there remain in Albany only one complete example (the Albany Academy) and a few fragments of the work of Hooker. Outside of Albany there are still a few good examples of his work, including Hyde Hall at Springfield, on Otsego Lake, and the Hamilton College chapel at Clinton.

As is so often the case, the true value of the work of Hooker was not fully realized until it was almost too late to learn anything of a personal nature about his career. He left no descendants and no personal correspondence, and the notes bearing on his connection with the various buildings are so meager that there is doubt in many a case as to whether he was actually the architect of the building. Mr. Root has collected such information as is available and published it in attractive form, using as illustrations the best available photographs and drawings of buildings known to have been designed by Hooker. Although the author modestly asserts that his investigations resulted in an accumulation of dead facts, and that the book as published is intended "primarily as a source book, a publication of records likely to be overlooked or lost," it seems that to the discerning reader it will prove to be much more than this. True, the main portion quotes liberally from the reports and minutes of meetings and from letters and other documents, yet these references have such a direct bearing on the everyday life of the times and the way in which an architect of that day carried on the duties of his profession, that they cannot fail to be of absorbing interest to the architecturally minded reader who is interested in the history of the profession. For the general reader there is an introduction of considerable length discussing the background for the work and containing a well written crit-

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ical description of some of the work of early American architects. As a source book it is of great value, for although the work of Hooker, as is pointed out, was often adapted from that of others farther east or in Europe, it shows a very masterful handling of the Renaissance and is typically American in every sense. It is said that Hooker was the last of the American architects to receive the Renaissance "in unbroken succession from its originators." After him came the period of "revivals."

The illustrations from photographs of buildings now in existence are, of course, very well chosen and presented, but in the case of those examples that have fallen before the march of progress we are less fortunate and must be content with views having some especially timely interest, but little architectural treatment, such as a view of the Albany City Hall on the morning after the fire of 1880, and a view of the first capitol building seen through a park filled with snow-clad trees. Of the buildings built from Hooker's plans now remaining in anything like their original form, perhaps the most important is the Albany Academy, located in the park to the north of the present state capitol building. This structure is quite generally recognized to be one of the outstanding examples of Georgian architecture in the United States. It has been little changed and is still used for school purposes, although the school has outgrown the building and is contemplating moving to a more favorable location. Both Governor Smith and Governor Roosevelt have appealed to the legislature to provide for its preservation by the state, and there has been some talk of using it as an executive mansion for the governor. Whatever use is to be made of it, it is to be hoped that the state will find some means of preserving for posterity this fine old building. Architecturally it contains a wealth of material, with its delicate and yet bold decorative treatment, which together with the dignified proportions of the mass make it a subject worthy of careful study. That Hooker was also a master of interior design is shown by his treatment of the chapel of this building as well as by the salon and dining room of Hyde Hall. These two rooms are among the finest in America and are preserved in almost their original state.

The Hamilton College chapel is noteworthy chiefly on account of its facade and bell tower, which were probably the only portions of the building designed by Hooker. The officers of the college ordered by mail "a plan or elevation of a chapel," and it is presumed that the remainder of the structure was built to fit Hooker's front elevation. A few other fragments of Hooker's work remain, among which is a part of the facade of the old New York State Bank of Albany, which in 1927 was moved several feet westward and incorporated in the wall of the bank's new 16-story office building. This amusing concession on the part of "modern business" to sentiment is very commendable, although the architectural effect of the original building is almost wholly lost. Many churches, residences, schools and business buildings known or supposed to have been the work of Hooker but long since demolished are discussed, and it is evident from the scarcity of material existing on this subject that Mr. Root's investigations were made none too soon, for it is likely that in a few more years there would have remained not even a memory of his work.

PHILIP HOOKER. By Edward W. Root. 242 pp., 9 x 12 ins. Price $12. Charles Scribner's Sons, New York.

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ARCHITECTURAL DETAILS OF SOUTHERN SPAIN. By Gerstle Mack and Thomas Gibson. 100 measured drawings and 113 illustrations from photographs. Price $16. William Helburn, Inc., New York.

THIS work by Gerstle Mack and Thomas Gibson falls into a class of publication which the architects of America are coming more and more to lean upon for sound and intelligent reference data on a given style.

The most helpful thing that might be said about the examples selected by the authors is that they are least of all imposingly "stylish" things. Rather these illustrations concern very intimate and personal qualities drawn from the houses from which this material has been collected,—and amazingly well drawn and photographed. The measured drawings of the volume are perhaps done with as fine a finish and convey as much intimate knowledge of their subject as any such drawings this reviewer has ever seen. And after the volumes of Byne and Stapley, it is always somewhat surprising to realize, in a freshly searching volume such as this, what a rich and constant source of architectural inspiration an area such as southern Spain may give birth to.

In the make-up of the volume, we are glad to note that there are almost as many measured drawings as illustrations from photographs, and the sizes of the latter have frequently been reduced in order that the measured drawings might occupy full-page spaces. It is also a definite pleasure to note that, in spite of attention being called to the fact that the illustrations are placed opposite the measured studies in order to convey the effect of time and climate in the examples, in actuality the drawings are so carefully observed, so felicitously executed, that they are what must be regarded as the most revealing characterizations of the details presented. The authors have wisely limited their scope to material which will be found definitely applicable by architects in America. They say: "The major part of the work is devoted to domestic architecture. During the sixteenth and seventeenth centuries an enormous increase in wealth followed the Spanish conquests in America; the nobles built magnificent palaces, and general improvement in the standards of domestic comfort took place. Details from several of these great houses are illustrated here, as well as a number of examples from simpler village dwellings. Public buildings and museums were drawn upon for certain details, and churches, monasteries, and hospitals furnished the rest; but choice was made only of ecclesiastical details which might be adapted to secular use."

Neither the Gothic, which has always seemed strange in its Spanish phases, nor the Moorish, likewise a rather special quantity, has been included in the volume. There is just enough information offered in the brief introduction to make one who might be interested in certain data regarding these architectural types wish for more. And it might be added that since the selections have been so critically made, the photographing so interestingly done, and the drawn matter so thoroughly studied, one would perhaps find the volume more significant had there been included, if only a few pages of it, something slightly biographical or perhaps personal regarding the authors and concerning what must have been for them a series of most charming excursions and minor expeditions in a fascinating portion of the Spanish peninsula. In a sense this would have been perhaps somewhat more a book and

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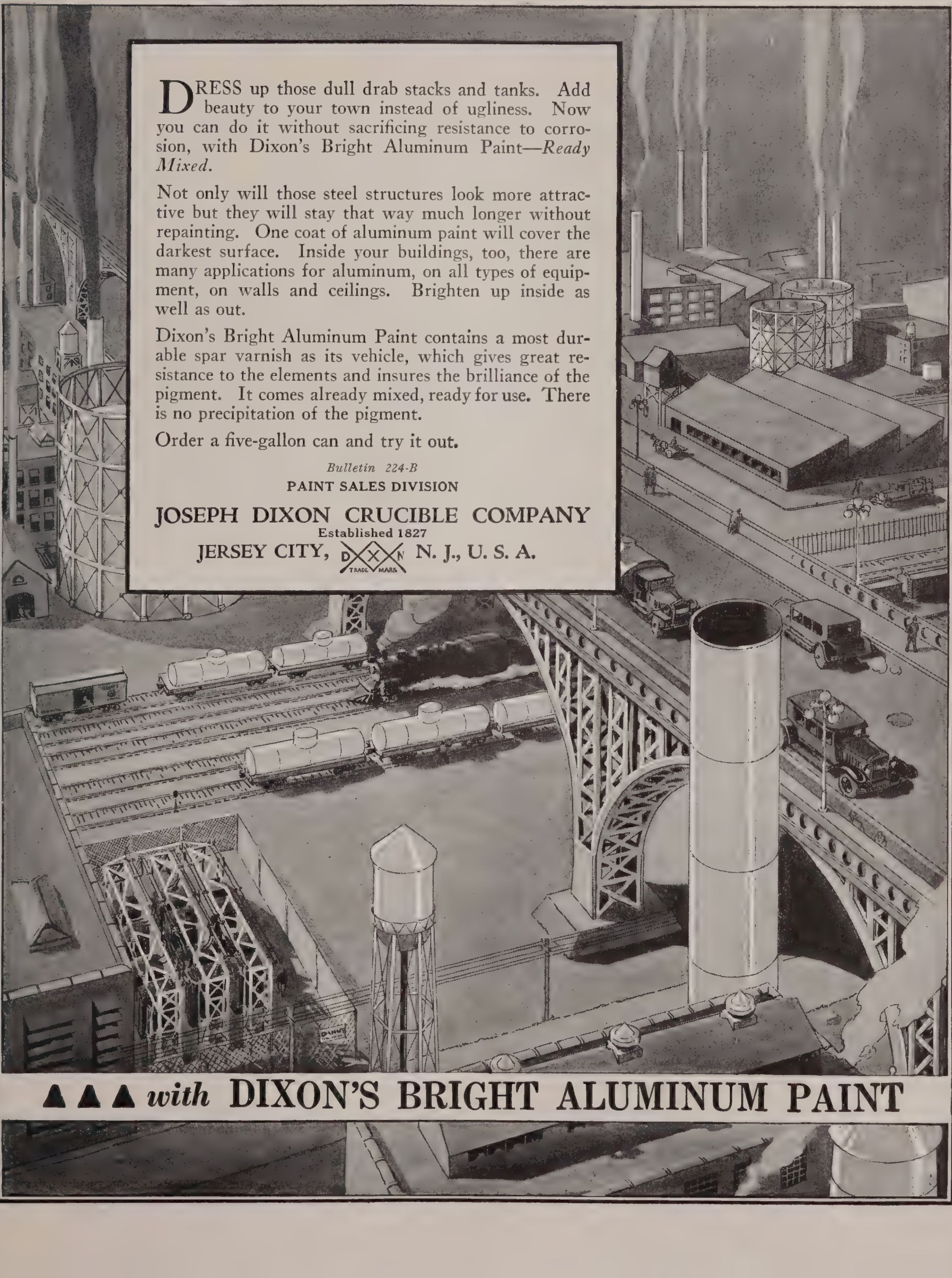

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less a file of merely available architectural data. But perhaps this is pushing criticism somewhat too far.

It should be noted that in selecting the material for this volume the authors have, with every good reason, avoided presenting too many over-all or general views of facades, and that they have focused their illustrations on the more intimate details and what are, architecturally, the more significant parts of these buildings. The material has been gathered copiously from Cordova, Ronda, Ecija, Andujar, Seville, Ubeda, Dsuna, Baeza, Granada, Carmona, Jerez and Arcos de la Frontera. A perfect wealth of details from these cities is finely representative of the best things and particularly in splendidly paneled doors, intricately carved; wrought ironwork; and there are a few very delightful fountains, windows, balconies, escutcheons, brackets, and splendidly ornate beamed ceilings. The illustrations of ironwork which are included in this volume are alone a sheer delight, and one is constrained again to remark on the exquisite draftsmanship with which there are so faithfully recorded many little vagaries, slight irregularities, and many thoroughly ingenious mannerisms of construction.

DOMESTIC ARCHITECTURE IN RURAL FRANCE. By Samuel Chamberlain. Text and 55 plates, 9¾ x 12¾ ins. Price $12.50. Architectural Book Publishing Co., New York.

FOR securing material to stimulate the imagination in designing smaller buildings in this country, no field is more fertile than rural France. It is considered almost essential to a thorough education in architecture that the student have at least some travel in Europe, and especially in France. Too often this is done in a hurried and superficial fashion, and the traveler dashes about from one well known place to another for a few weeks, and then leaves without even suspecting the great wealth of material that lies hidden in out of the way places. The better known buildings have been so frequently photographed and sketched that they have become a rather old story, so that it is to the bypaths and the crossroads of the more remote districts that one must go for fresh inspiration. Moreover, the subjects to be found in these places are often those most adaptable to application in modern domestic building. The half-timbered and stucco effects borrowed from French buildings have already been used to advantage in this country, and yet the field has scarcely been touched, and in the constant effort to improve the quality of our architecture, a great deal can be learned from study of the farms and villages of rural France. The vast extent of this field of study makes it almost impossible for an architect or student to anywhere nearly cover it during the time that is usually available for this sort of study. The provinces of Burgundy, Auvergne, Provence, Normandy, Brittany and Touraine are especially rich in this material. On every hand one comes upon intimate bits of domestic architecture, unspoiled by so-called modern improvements and expressing the character and history of the French people developed during a period covering several centuries.

In making his collection of sketches of these hitherto unpublished gems, Samuel Chamberlain spent over two years in traveling in an unhurried fashion through the rural districts, making sketches of such subjects as seemed appropriate for a painstaking and well premeditated series of plates. Being in no hurry to get somewhere, he was able to search out the best examples of old buildings and to give much careful study to the preparation of his sketches. These are executed in the various black and white media of which Mr. Chamberlain is master, including lithograph, drypoint, pencil and wash. The subjects chosen include a wide range of old buildings from the most pretentious chateaux to the humblest cattle sheds, all sketched in a pleasingly informal fashion, yet with the greatest attention to correct proportions and accuracy of detail. There is a frontispiece consisting of an original signed etching of Bourges, printed in Paris on Papier d'Arches by M. Edmond Rigal, one of the foremost plate printers of France. The rest of the plates are printed on heavy plate paper, 9¾ by 12¾ inches. More than 250 subjects are illustrated, and they include, in addition to cottages, chateaux, windmills and farm buildings, several measured drawings of wrought iron work and details of doorways. Although one or two well known buildings are illustrated, most of the sketches were made in places whose very names will be unknown even to those familiar with the French countryside. An interesting foreword by Mr. Chamberlain contains a brief description and some valuable comment on many of the subjects illustrated, which add greatly to the interest of the sketches. A brief resume of some of these descriptions may give an idea of the variety and usefulness of the subjects illustrated. Five sketches illustrating some new ideas in half-timber work from Liseaux are shown on Plate 1. A row of five houses under one roof at Conches should be especially interesting to architects doing suburban work, and a group of fourteenth century stone towers on a farm near Chartres is most interesting. A study in informal grouping of windows and doorways in houses at Vitre is readily adaptable to small houses or shop fronts in this country, and the rambling, informal farm buildings shown on Plate V present interesting combinations of timber treatment and various roof coverings. The "Farmyard of M. Billebot," near Vernon, is delightfully ancient and informal, with a most interesting outer gate. These plates are followed by several sketches of picturesque cottages and sunny streets in tiny villages and a dry point of a winding street in Vernon showing a glimpse of the church in the background. Another etching of this town shows the market place on Saturday morning and is full of life and architectural interest. More cottages from little known towns are followed by several unpretentious though interesting chateaux. The plate entitled "Details of Farm Buildings in Normandy" presents interesting compositions in half-timber and masonry. In the plates that follow many interesting farm and town houses are sketched in a most pleasing manner, and the detail drawings of ornamental iron brackets, gates, locks and door fittings give valuable suggestions for adaptations. The plate on windmills, although perhaps not so valuable as some others for purposes of emulation, is very interesting and original. This is a brief description of only a small part of the material shown, but it will perhaps give some idea of how the artist has worked with a view to collecting such material as may be adapted to American domestic architecture. In addition to its value as a source of architectural reference, the sketching technique is worthy of study, and the work is most interesting to the laity.

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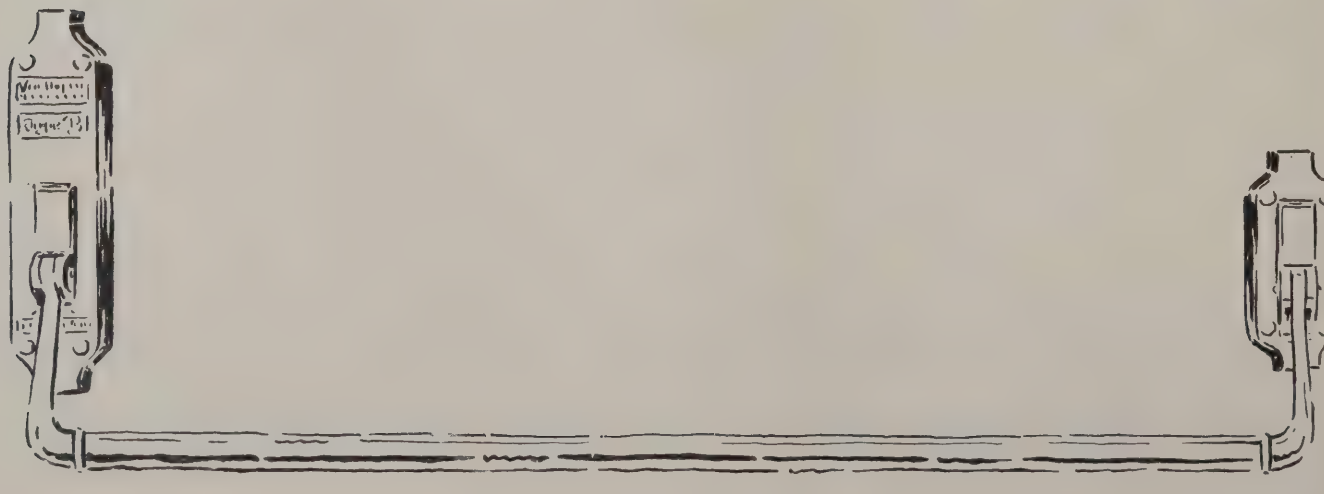

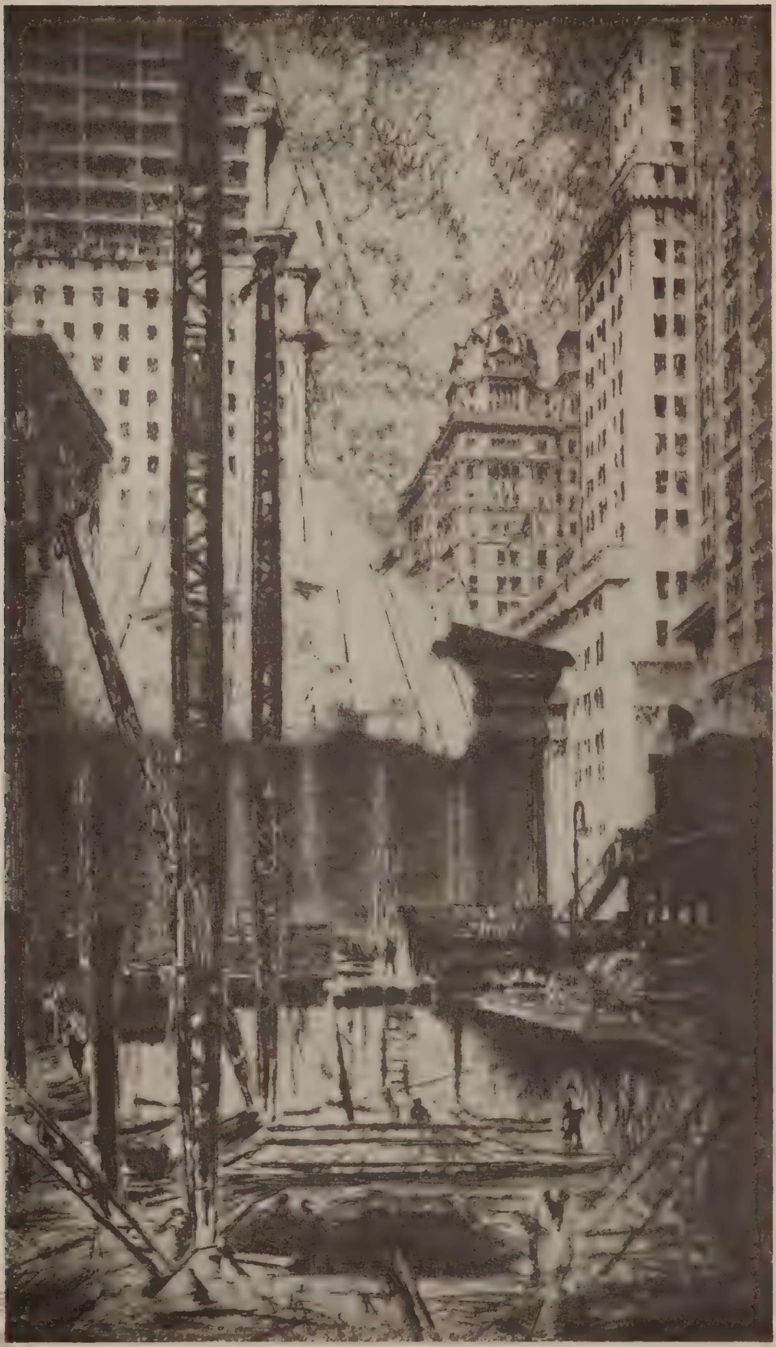

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THE
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VOLUME L   MAY, 1929   NUMBER FIVE

CHOOSING STRUCTURAL SYSTEMS AND MATERIALS

PART II—EXTERIOR WALLS AND WATERPROOFING

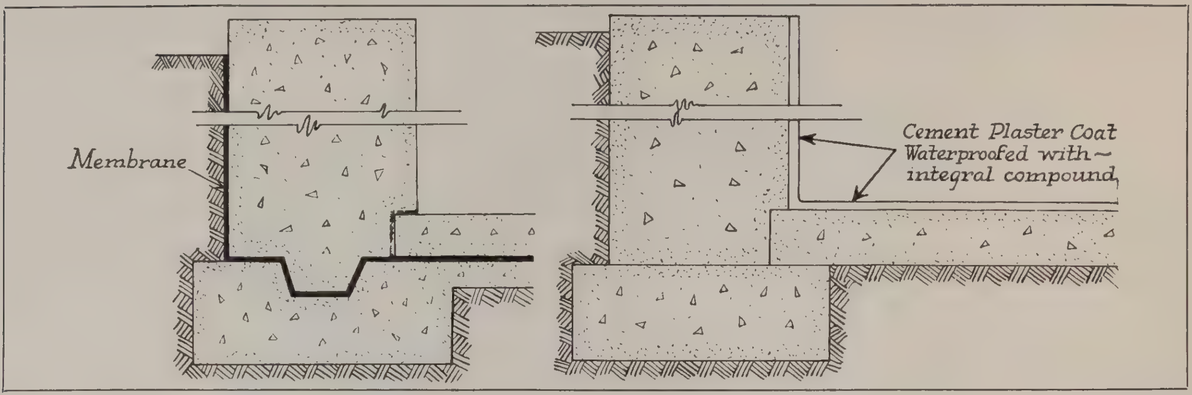
BY
THEODORE CRANE
ASSOCIATE PROFESSOR OF BUILDING CONSTRUCTION, YALE UNIVERSITY

SINCE the earliest days, walls have served mankind as enclosures for the purpose of protection. Many and various methods have been used, depending upon the material available and the skill of the builders. In ancient and mediæval times the stone walls of isolated residences, three or four stories in height, were often of masonry 6 or 8 feet in thickness. Such were not necessary as supports for floors or roofs, but every foot added a definite increment to the time required by an enemy to effect a breach. Through long ages military considerations played a large part in the construction of most important structures, even within the limits of walled cities, and military motifs, such as crenelations and machicolations, still appear in the architecture of today.

With the development of modern artillery and the resulting futility of offering even massive masonry as a target for heavy ordnance, military necessity, of course, ceased to exert an influence on construction. In modern buildings, the utilitarian purpose of walls is to support incumbent loads, resist the inclemency of the weather, and give a certain amount of privacy to those within. Artistically, their exterior and interior finishes, thicknesses and disposition, must meet the architectural demands. It is not mere banality to rehearse these all too obvious requirements. In our search for combinations of materials, the use of which will effect the greatest economy, these simple, basic principles are often lost to view in the mist produced by modern advertising and high powered salesmanship. That our present methods of construction are a complete success, few would have the temerity to affirm. It would seem desirable to advance step by step in our consideration of anything as important as wall construction. It is not easy, for instance, to make tall buildings water-tight against wind-driven rain. Some of the most important structures in New York have caused no end of trouble, simply because their walls do not serve the basic requirement of being satisfactory enclosures. The pity of it is that these conditions are preventable; even with the limitations of our present knowledge, the profession knows how to build tight walls, and workmen properly supervised are capable of doing it.

Proportioning Footings. Let us first consider the requirements of stability or structural strength and commence at the bottom or foundation of the wall. Structures may rest upon rock, soil, or piles. The choice of footings for the support of piers or columns was referred to in the April issue of The Architectural Forum. Bearing walls and load-carrying partitions occur principally in buildings of only a few stories in height, and the footings are usually built of concrete with sufficient width to bring the load per square foot within the permissible bearing value of the soil. This would be a very simple matter were it not for the fact that most soils are compressible when subject to even moderate loads, well within the limits of ordinary practice. This fact makes it necessary to widen footings under piers and chimneys, or other masses of masonry, and to make proportionment of footing areas on the basis of dead load alone, or in combination with a small portion of the live load. This matter receives careful attention on the part of the engineer when he is employed to design important structures, and it should not be passed over too lightly by the architect if he would have his buildings settle evenly and avoid unsightly cracks.

To illustrate the application of this principle, consider the case of a three-story-and-basement school building with exterior bearing walls and interior columns supporting any type of fire-resistant floor system. Under most building ordi-



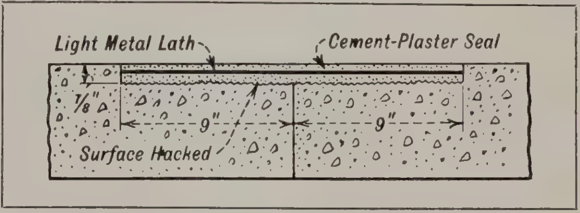
Left: The Membrane Method of Waterproofing Basements Where the Exterior Surfaces of Walls Are Accessible. *Right:* The Plaster-Coat Method of Waterproofing Basements, Applied Upon the Interior.

nances the classrooms would be designed to support a live load of 75 pounds per square foot. Published investigations by the Building Code Committee of the Department of Commerce lead us to believe that normal occupancy would result in an actual live load, including pupils and desks, of between 10 and 14 pounds per square foot. The *constant* and not the *occasional* loads are those that cause settlement. It is also true that the proportion of live load to dead load is much higher for the interior supports, such as columns, than for the exterior walls. If we design our footings for the entire live and dead load, *without other proportionment,* the interior footings will exert a much lighter soil pressure, owing to the fact that 60 or perhaps 65 pounds per square foot of live load are non-existent. In order to avoid the possibility of the exterior walls' settling more than the interior of the building, it is not only necessary to design the footings of adequate sizes to carry, with the allowable soil pressure, the *full design load* of the buildings, but also to proportion them, as in this case, on the basis of the dead load alone.

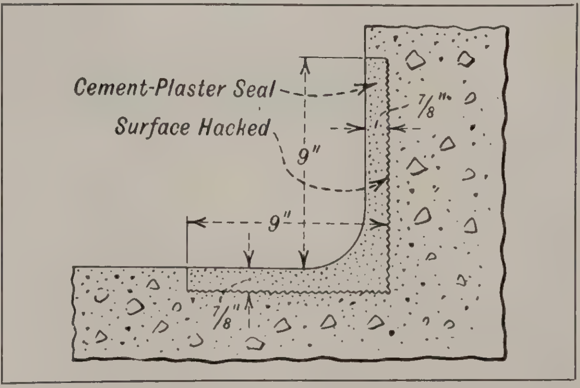
Foundations resting upon piles present a condition entirely analogous to soil-bearing footings. Piles may be driven to refusal, or their sustaining power may be due to "skin friction." In the latter case they will probably be subject to greater settlement than if their ends reach an impervious stratum. The most critical condition is where a portion of a building rests on rock, or other unyielding material, and the remainder of the structure is supported by a compressible soil or piles subject to settlement.

As the function of basement walls is purely structural, use should be made of the cheapest material that will give support and impermeability. The latter requisite, as applied to masonry, is a somewhat relative expression, and it is often economical to accept a system of drainage in lieu of absolute water-tightness in basement construction. This principle is acknowledged in the design of some of our largest buildings, where sub-cellar drains, sumps and automatic pumps are installed, as well as in residence work where land tile are used around the exterior footings. Concrete, plain or reinforced, is probably the most popular material for basement walls in many sections of this country. There is no question about its load-carrying capacity, nor its ability when properly reinforced to resist the pressures due to earth thrust and surcharge. The chief difficulty arises in the fact that, as ordinarily built, concrete does not fully resist the passage of ground water; neither does rubble masonry or the other materials ordinarily used for basement walls.

Waterproofing. It would seem to be the general practice in building construction where brick or stone masonry is required to resist any appreciable head of ground water, to employ an ap-



Cement Seal at Joint in Integral Waterproofing



Method of Reinforcing a Construction Joint Between Floor and Wall in Integral Waterproofing

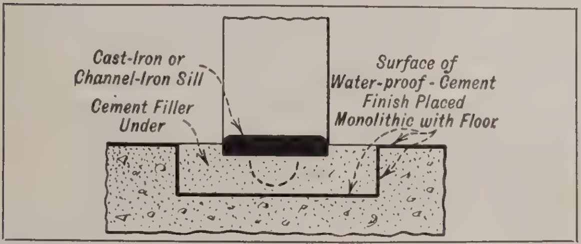
Rough Flush Joints, of Coarse, Dry Mortar Cannot Be Expected to Be Rain-tight in Exposed Locations

A Well Compressed, Weathered Joint Helps Make Walls Tight Against Wind-driven Rain

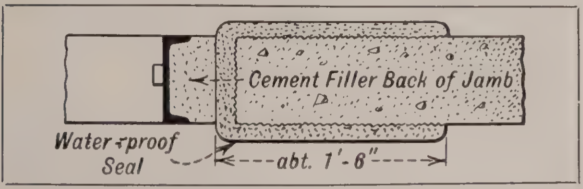
plied waterproofing. Such is usually of the membrane or of the "cement-coat" variety, although certain methods employing bituminous compounds are occasionally used without a membrane, and the so-called "iron process," referred to later, may be applied to brick walls. Owing to the fact that concrete is manufactured on the site, it is possible, in the case of this material, to use integral compounds. This fact has been the genesis of a great and widely advertised industry. There does not seem to be any valid objection to the use of accredited admixtures in concrete work, and in fact many of them have a distinct value for waterproofing purposes. The unfortunate part of the situation is that emphasis has too often been laid upon the use of proprietary compounds instead of upon good workmanship. Good concrete is reasonably impermeable to water, but poor concrete cannot be made so by the use of any admixture yet placed upon the market.

The subject of waterproofing concrete walls has received a great deal of attention during recent years. Broadly speaking, the various systems at present in general use are:—

1. The membrane method, employing layers of felt, jute or cotton drill laid in pitch or asphalt, or some composition of bituminous materials.


Cast-Iron or Channel-Iron Sill
Cement Filler Under
Surface of Water-proof - Cement Finish Placed Monolithic with Floor

Cement Waterproofing Under a Metal Door Sill



Cement Waterproofing Back of a Metal Door Jamb

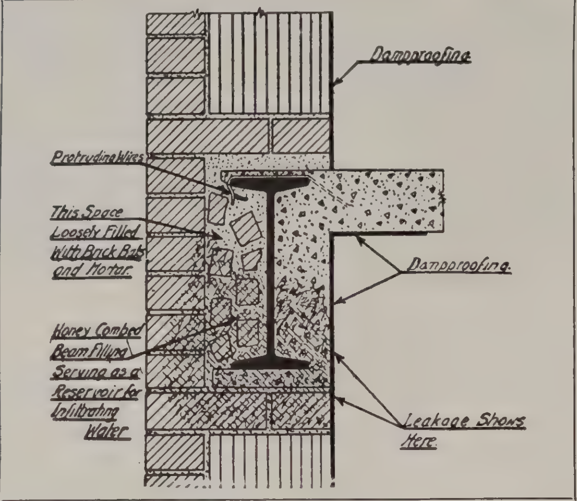
2. The "plaster-coat" method, being the application of two coats of cement mortar, containing a waterproofing compound, to face of wall. The total thickness is normally ⅝ to ¾ of an inch.

3. Integral compounds, which are added as dry ingredients to the cement, or as liquids to the mixing water, for the purpose of making the concrete itself more impermeable.

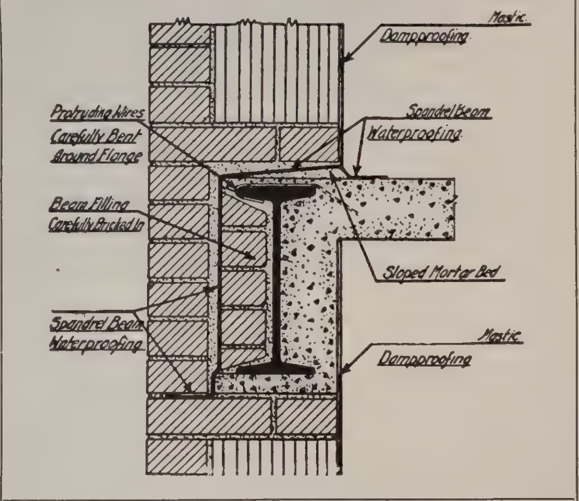
4. Various spray, brush, mop and trowel applications to walls below grade, generally employed where no hydrostatic pressure exists.

The problem of choosing the best type of waterproofing is so dependent upon the particular conditions of the particular work that it is extremely difficult to give any general rules. The membrane method, employing a good quality impregnated fabric with an elastic binder, can be successfully used against high pressures, but the cost is often very high. For comparatively shallow basements, the membrane can be applied to the exterior, but when the outside of the building below grade is inaccessible, the cost of interior application, with the accompanying seal, makes the operation proportionately more expensive. Some of the largest buildings in New York have exterior walls sunk by the caisson method, 50 to 70 feet below ground-water level. On such operations the so-called "plaster-coat" method, applied to the interior of the wall surfaces and to the cellar floor, has been successfully used. It should be remembered, however, that the concrete walls are often 6 or 8 feet in thickness, and that a system of drainage is usually installed below the cellar floor, connected to a central sump and relieved by automatic pumps. Furthermore, the mortar is carefully prepared with Portland cement mixed with a well graded sand and an effective waterproofing compound. The success of such work done by trained mechanics, under expert supervision, is no reason to accept this method where technical skill is unavailable.

The principle of waterproofing the concrete composing the wall, instead of applying surface applications, has very interesting possibilities, but under the conditions ordinarily encountered in building construction, it requires the greatest care


Dampproofing
Protruding Wires
This Space Loosely Filled With Brick Bats and Mortar
Dampproofing.
Honey Combed Beam Filling Serving as a Reservoir for Infiltrating Water
Leakage Shows Here.

A Typical Spandrel-Beam Construction That Frequently Causes Leakage


Mastic.
Dampproofing.
Protruding Wires Carefully Bent Around Flange
Spandrel Beam Waterproofing.
Beam Filling Carefully Bricked In
Sloped Mortar Bed
Spandrel Beam Waterproofing
Mastic
Dampproofing

A Typical Spandrel-Beam Construction Showing a Recommended Method of Flashing

if the work is intended to withstand any appreciable head of water. The concrete should be composed of well graded aggregates proportioned for maximum density. The mixture should be thoroughly homogeneous and as dry as may be consistent with perfect "workability." Some waterproofing preparations add to the plasticity of the mixture, thereby lessening the amount of water required for placement, which results in a stronger and more impermeable concrete. It is also claimed that the addition of certain compounds causes a more complete hydration of the cement. The use of calcium or ammonium stearate, which is the active ingredient of numerous waterproofing compounds, has been found to greatly reduce the capillarity of mortars, but this effect is of much greater comparative value against wind-driven rain above grade than against hydrostatic pressure below ground. Another method of integral waterproofing consists of introducing 2 or 3 per cent of inert material for the purpose of filling the voids of the concrete. The object is excellent, but unfortunately the air and water voids in the completed mass, which do affect permeability, cannot be so easily filled.

The whole subject of integral compounds has given rise to so much acrimonious discussion that it is a very delicate field upon which to trespass. The proposed building regulations promulgated by the American Concrete Institute have very consistently avoided any reference to the subject, from the first "Standard Building Regulations" published in the "Proceedings" of 1917, to the tentative "Joint Code" published in 1928. It is not the function of a building code to control decisions in regard to methods of waterproofing. The various "Joint Committees" on specifications, however, have taken a real interest in the subject. In 1926 the "Final Report" of the old Joint Committee could hardly be said to encourage the use of integral compounds; in 1921 the "Progress Report" of the new "Joint Committee" said that "Integral compounds shall not be used"; the "Final Report" in 1924 contained the specification that "Integral compounds shall not be used for waterproofing unless specifically authorized by the Engineer." This committee represented four of the leading professional societies, and there was no higher authority in the field at that time. On the other hand, we have a record of excellent results obtained by the better grade of waterproofing compounds, where they have not been expected to do the impossible and have been used with a just appreciation of their limitations.

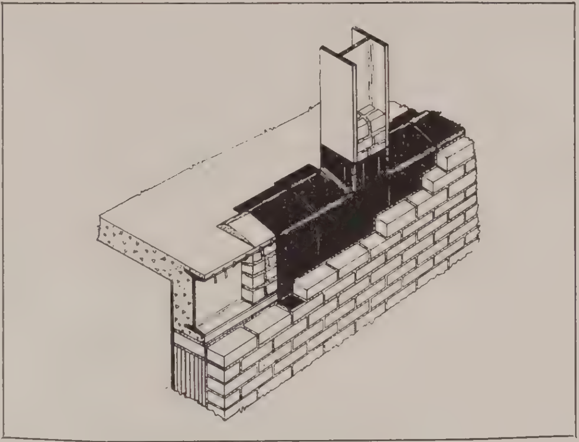
When employing this method of waterproofing basements against actual pressure, it is essential that the floors and walls be properly keyed together, that laitance and honeycomb be eliminated, and that complete homogeneity as well as a tight, interlocking bond be obtained between the concrete comprising sections poured at different times, such as that placed on successive days. The fact that these conditions are extremely difficult to obtain, is adequate reason for reserving this system of waterproofing for work executed under the strictest supervision.

Brush and spray applications should generally be considered more in the nature of dampproofing than waterproofing treatments. However, there are at present materials falling under this classification, such as an emulsified asphalt, which seems to be satisfactory against a considerable head. Furthermore, the "iron process," which consists in applying three or more coats of iron dust, mixed to a cream with water combined with varying amounts of Portland cement, has been used successfully on basement walls where comparatively little pressure existed. Nevertheless, the chief value of these preparations is for dampproofing basement walls and as surface coatings above grade, to reduce the permeability of masonry. Of course, only the colorless compounds can be used on the exteriors of buildings, but the bituminous compounds are usually to be recommended on other than exposed surfaces.

Masonry Walls. Omitting special types of construction peculiar to certain localities, exterior masonry walls above grade are usually built of brick, stone, concrete, load-bearing terra cotta, or cement block. All of these materials have sufficient structural strength, and when built into masonry walls of the thickness called for by good practice and code requirements, they furnish adequate support to carry imposed loads. In other words, if the exterior finish of the building is to be brick, either terra cotta, "back-up tile" or common brick can be used for the body of the masonry wall. In most climates an air space is necessary to avoid condensation, so if solid brick is used the wall should be furred, preferably with terra cotta. The requirements of appearance, structural strength and insulation will then be satisfied, but it remains to make the wall rain-tight.

Brick is one of our oldest manufactured articles. Its origin as a structural material is lost in antiquity, many thousand years ago, but it is not a uniform product. Architecturally, this is an immense advantage, permitting a pleasing variation in texture and color of wall surfaces. Structurally, it implies the necessity for accurate specification in order to obtain the best results. Most bricks are sufficiently impermeable to shed water on vertical surfaces. Standard requirements eliminate the soft "salmon" bricks or those that fall below a minimum compression strength, and often they place a maximum limit upon the absorption of about 15 per cent by weight. But it is not customary to place a *minimum* requirement upon the absorption, nor to specify a low limit on the modulus of rupture. Face brick, similar to those used recently for a building in southern New England, give an absorption of less than 2 per cent. The walls constructed of these units showed a lack of bond between brick and joint, which was a contributary cause of serious leakage.

Weatherproof Brick Walls. It is probably true that most of the trouble from leaky walls is not due to the quality of the materials, but to the faults of execution, and it occurs principally at floor levels in skeleton buildings, along parapets, and around openings. It would appear, however, that care should be exercised in the choice of brick for exterior use in exposed locations, and preference placed upon those which have enough absorption to draw the mortar into the pores, without being sufficiently porous to become water-soaked during hard, driving rains. Furthermore, the specification for thoroughly "wetting all brick immediately before laying" is one that should be considered in the light of the characteristics of the particular brick to be used, and not as a standard clause. Neither should brick be laid in weather even *approaching* the freezing point without due precaution. The technology of brickwork is a subject which merits, and is at present receiving, very serious consideration. It is to be hoped that the building departments of our municipalities will, in the near future, avail themselves of the information offered by our scientific committees and manufacturers' associations. To specify a limiting value for the compressive strength of brick probably results in eliminating very soft, underburned material, but this requirement is only remotely related to the strength of the wall which the specification is supposed to safeguard, as failure seems to result from the *breaking* of the brick and not from their *crushing*. As there is not a definite relation between these two types of stress, it would seem desirable to specify a minimum value for the modulus of rupture.



Spandrel-Beam Waterproofing

The character of the joints, as well as the bond between mortar and brick, plays an important part in making walls rain-tight. With all due respect to architectural considerations, thick joints of coarse, dry mortar should be avoided in exposed locations. The raking out of joints is only a little more harmful than the ordinary method of "striking" a flush joint by which the mortar is torn by the trowel and often actually drawn away from the side of the brick. A vast amount of trouble within the last few years, particularly on the tall buildings in New York and Philadelphia and hotels at Atlantic City, has proved that the proper construction of the joints is of vital importance. It is desirable to point the joints with the same mortar that was used in laying the wall, as a richer mixture gives greater contraction on setting. A waterproofing compound such as ammonium stearate, which has been definitely proved

Los Angeles Public Library, Under Construction, Showing the Use of Poured Concrete for Exterior Walls
Bertram Grosvenor Goodhue, Architect. Carleton Monroe Winslow, Associated

to reduce capillarity, is strongly recommended. The correct amount is about 2 per cent by weight of the cement. A normal, cement-sand-lime mixture should be used, but the sand should be carefully chosen as clean, not too fine, and well graded. In the operations of pointing, particular care should be exercised to thoroughly compact the mortar; a so-called "rodded" joint or a well pressed "weathered" joint is to be preferred.

The choice of the bond is not an important matter from a structural viewpoint, as all standard bonds give adequate strength. If 8-inch walls are used, it is necessary to thoroughly bed the through headers, and two coats of bituminous dampproofing on the interior give excellent insurance, although inadequate to overcome any serious defects such as settlement. Fortunately, 12-inch walls are required for all important buildings, and the longitudinal mortar joint should serve as a water break.

The design of details, as well as the quality of the work, should be given serious consideration if exterior masonry walls are to be made tight against wind-driven rain. It is very important that drips be provided on all projecting or capping members, such as parapet copings and window sills. Stone sills with lugs are less likely to leak than those of the "slip sill" pattern. The upper surfaces of masonry units should also have a pronounced slope or wash. It should hardly be necessary to say that flashings must be properly designed and gutters and leaders be of adequate proportions, yet much trouble is due to the neglect of these items. Particularly troublesome is the leakage through vertical joints in brick sills and parapets. These should be pointed with mortar containing a water-repellent, such as ammonium stearate, and flashed entirely across the wall with copper or with a high grade membrane, as the latter is quite effective and much easier to use. The backs of parapets should also be flashed with metal or membrane and not merely painted with a "black waterproofing." A great deal of serious leakage results from poorly designed parapets, and even if water is prevented from entering the building by flashings carried across the wall at the roof level, efflorescence may appear upon the exterior unless the *inside* is rendered impermeable.

Elastic cement should not be counted upon to make tight the vertical joints between natural or artificial stone, employed for cornices and copings, except when it is impracticable to flash. In most cases a metal or membrane flashing can be installed as illustrated by the standard construction employed for cornice work. If this is not feasible, a high grade elastic compound should be chosen that will not stain the stone nor quickly decompose under climatic variations. It is ques-

The Los Angeles Public Library, Nearing Completion, Showing the Architectural Effect Obtained
Bertram Grosvenor Goodhue, Architect. Carleton Monroe Winslow, Associated

tionable, however, if any material on the market will permanently close vertical joints on exposed work. The principal use of elastic cement, or more properly of caulking compounds, is to make weather-tight joints around openings. Wood frames in masonry walls should be packed with oakum on top of which a beat of elastic cement can be run beneath the staff bead. The same material is used to advantage in making tight the junction between the wood sill and the supporting masonry. A similar process, without the use of oakum, can be successfully applied to the setting of steel or hollow metal frames in masonry walls.

Waterproofing Spandrel Beams. One of the most frequent sources of trouble on structural steel buildings, is lack of proper flashing at spandrel beams. The typical "cinder arch" floor construction, so widely used in parts of the East, often results in providing practically no resistance to wind-driven rain other than a 4-inch brick or stone veneer. As this condition occurs at all floor levels, it is hardly any wonder that a large number of our tallest buildings have developed serious leaks. This situation has lately received considerable study on the part of some of our best builders, assisted by waterproofing engineers. On new work of the better class a membrane is employed, often backed up by a trowel coat of mastic. It is first necessary to fill with brick the space between the flanges of the beam, bending the ends of the floor slab reinforcement out of the way. A bed of cement mortar is then laid on top of the floor arch, along its outside edge, to form a base for the waterproofing. The membrane and mastic are applied, as shown in the sketch, included here, when the brickwork of the veneer has reached the first course below the bottom flange of the spandrel beam and is built into the masonry, continuing over the top of the floor arch a distance of 3 or 4 inches beyond the inside face of the wall. The membrane is placed on three sides of ordinary wall columns and upon all four sides of corner columns. These precautions apply to stone as well as to brick veneer.

Efflorescence. The problem of making exterior walls rain-tight is closely associated with that of efflorescence. Soluble salts are always present in varying amounts in cement, brick and terra cotta; if such come in contact with moisture, by reason of inadequate flashing or leaky joints, they are likely to be carried in solution to the face of the masonry and there deposited as white coatings which not only disfigure the wall, but actually exfoliate the surface. Efflorescence consists of various compounds, principally sulphates and chlorides of sodium, potassium, calcium and magnesium. Because the formation of minute crystals takes place under the surface, as well as upon the face of the wall, serious scaling often results.

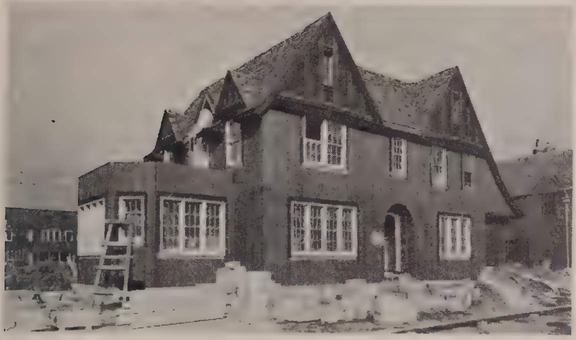
Some excellent research work has lately been

The Biology Building, California Institute of Technology, Illustrates a Design Particularly Suited to Reinforced Concrete. The Wall Surfaces Were Later Stuccoed
Mayers, Murray and Phillip, Architects

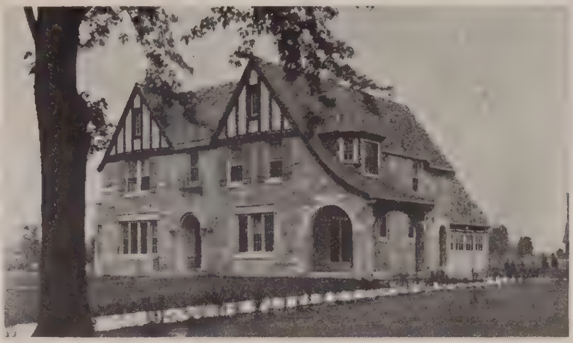
devoted to the investigation of these phenomena, from which it is possible to make definite recommendations to eliminate, or at least to materially lessen, this evil. In the first place, the design should provide for thorough flashing and require adequate drips on all projecting members. Fine buildings should have a highly impermeable course such as granite, at the ground level, and every type of masonry structure should be provided with a layer of membrane with mastic separating foundation from superstructure, to prevent water being drawn up from the basement walls by capillary action. Natural stone veneer should be laid in mortar made with a non-staining cement, preferably waterproofed with calcium or ammonium stearate. The unexposed surfaces of the stone can best be protected by a heavy parging of the same mortar that is used for setting. If a coat of "black dampproofing" is preferred to the use of mortar, it is recommended that the material selected be given a thorough investigation, as some preparations offer but little resistance to the action of either sodium, magnesium or calcium sulphate.

Although it is not customary to lay brick veneer in a mortar containing non-staining cement, this would appear at times to be a very sensible procedure, as much of the efflorescence on brick walls seems to come from the cement. Both the ordinary Portlands and the other cements, now quite widely used in brick-setting mortars, contain soluble salts capable, in the presence of water, of producing discoloration. Having decided upon the materials to be used, the precautions to be taken against efflorescence are exactly the same as those required to make exterior walls raintight, with the added suggestion that while it is imperative to keep water from getting *into the wall,* it is extremely desirable to minimize the amount of water *flowing down the exterior.* It should not be inferred, however, that all efflorescence comes from the mortar. In some parts of the country, notably in southern Connecticut, common brick cause their full share of trouble, and it would seem to be a case of the pot calling the kettle black. The use of colorless applications for waterproofing purposes upon the exposed surfaces of stone or brick walls, is not always entirely efficacious. It is so difficult to completely seal a surface, even with the best of workmanship, that air and moisture will usually penetrate. Neither are the various proprietary washes advocated for the removal of efflorescence to be considered as universally permanently effective. It is quite a simple matter to clean the walls, but the white salts will soon re-form if the cause is not removed. There has been more or less discussion lately about the desirability of mixing barium compounds in the clay of which certain common brick are formed, for the purpose of reducing efflorescence by changing the sulphates into insoluble precipitates. This principle has been successfully applied both in the ceramic and the face brick industry; it would seem to be equally applicable to common brick.

There are very few builders who do not realize the importance of properly protecting both natural and artificial stone before and during construction. Brick should also be piled on plank and protected from snow and rain. Particularly



Residence Before Application of Stone Veneer
C. E. Reichle Co., Designers



The Same Building Veneered in Limestone Finished in Old Gothic. Random Ashlar

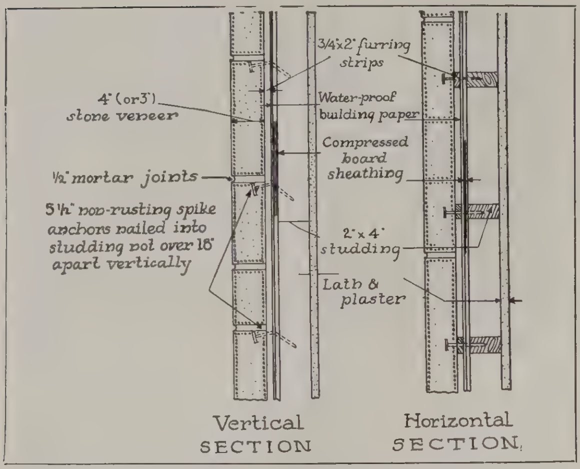
essential is some effective method of covering the tops of incompleted walls which must remain for some time exposed to the elements. During even a few days' exposure to heavy rains they may entrap sufficient water to cause discoloration of the surface of the wall long after the completion of the work. Serious efflorescence has also resulted from the seepage of rain water through a concconcrete roof slab, left for several months without a protecting membrane. In this case a limestone cornice was badly disfigured by the precipitation of salts dissolved from the concrete.

Concrete, Cement Bricks and Blocks. For over a generation now, while the more conventionally minded have been building walls of stone and brick and terra cotta, engineers have been experimenting with monolithic concrete. About 20 years ago this type of construction was applied to a number of dwellings ranging from large residences to very small houses; since then the public has quite often been aroused by the thought of obtaining "poured" houses at a fraction of the cost of building them. In the east, these ideas have never materialized on a large scale; the cost of the wood forms, the impracticability of using steel forms for other than standardized work, and the mechanical difficulties of handling comparatively small operations economically, have all counted in the score against building walls of poured concrete. On large operations, however, where local conditions are favorable, concrete walls may be cheaper than brick, and we are all familiar with their use for industrial buildings, where an efficient plant has already been installed for the concrete of the frame and floor constructic Again, it is extremely hard to generalize. Th architectural characteristics of concrete are so well suited to certain types of architecture, particularly the so-called "Spanish" style of our southwest, that this advantage alone may dictate its choice.

Cement blocks have been used in building construction since Civil War days; units removed lately from an old building showed a compression strength which would meet present-day specifications, although probably made from a natural cement. The average plant of today is turning out a product conforming to the requirements of the American Concrete Institute. Nevertheless, it is extremely important to make certain that the blocks are cured in such a way as to avoid, or rather to minimize, volumetric changes after incorporation in the building. At present it is not apparent that curing methods are standardized or at all times adequate, and if cracks are to be avoided, it is of vital importance that only thoroughly cured units be used.

Although the Portland Cement Association has laid down a conservative policy in regard to furring walls built of hollow cement units, it is regrettable that contractors will take the chance of plastering directly on the inside of the block. As in the case of terra cotta walls built of a single thickness of hollow tile, such construction may be successful, but it cannot be considered good practice. If properly designed, both terra cotta and cement block serve excellently as bases for stucco. The former is, at the present time, a somewhat more uniform product and not subject to as large volumetric changes. On the other hand, the bond between cement block, as ordinarily manufactured, and the base coat of stucco is excellent, while the tile surfaces depend largely upon the scoring for bonding. Besides these units that have been used for over a period of years, cement brick and cement cinder block have a wide field as "back up" material in the rear of brick or stone veneer, and the cement cinder block is particularly suitable under stucco.

Stucco. The use of stucco as an exterior wall finish in northern climates is a subject that merits serious consideration. Portland cement stucco can be applied successfully to brick, stone, cement block, terra cotta, wire mesh or wood lath. Some years ago wood lath ceased to be used for this purpose in many parts of the east, but excellent work in northern sections of the middle west definitely proves the possibility of obtaining good results with this construction. Metal reinforcement was, at one time, considered to fail by rea-


3/4"x2" furring strips
4" (or 3") stone veneer
Water-proof building paper
Compressed board sheathing
½" mortar joints
5½" non-rusting spike anchors nailed into studding not over 18" apart vertically
2"x4" studding
Lath & plaster
Vertical SECTION
Horizontal SECTION

Details Illustrating the Assembly of Stone Veneer Over a Wood Frame

son of rusting when used along the sea coast, but it has been found that such failures can be attributed to poor workmanship, as a dense mortar will adequately protect the reinforcement if the latter is properly placed.

Over frame construction, good practice would require a rather large meshed metal fabric held free of the sheathing by means of furring nails or other means which permit the stucco of the base coat to pass back of and to thoroughly embed the steel. The requirements covering materials and method of application are well defined by the excellent specifications furnished by the Portland Cement Association, which should be scrupulously followed. No one, however, can guarantee success if the work is done over a wooden frame that will shrink appreciably after the stucco is in place. Every precaution should be exercised to obtain well seasoned lumber and to permit the building to dry out as much as possible before the final coat of stucco is applied.

In this country comparatively little stucco is used over brick or stone; when these materials are employed, they are generally desired for their architectural as well as their structural value. Occasionally we see a brick chimney over which stucco has been applied, but it is almost impossible to avoid there being cracks due to temperature variations, which soon result in failure of the surface. Stucco over terra cotta or cement block is a thoroughly established method of construction. With proper care there is no reason why it should not be entirely successful. The partial failures, which are only too evident throughout the country, can be definitely attributed to improper specifications or to poor workmanship. Again, the data available in the publications of the Portland Cement Association can be taken as authoritative. In matters of design the limitations of the material, or rather its structural characteristics, should be clearly understood; particularly important is the avoidance of using stucco on other than vertical surfaces. For example, the tops of ornamental parapets, sills and belt courses are often a source of trouble. Chimneys above roofs should be built of brick or stone, without any surfacing, wherever the architectural design will permit such a treatment. If stucco is required, it should be carried upon wire fabric, placed so as to provide an air space between it and the block or tile composing the chimney. The flashings should receive particular attention, as it is of vital importance to keep water from penetrating in back of stucco. Particularly critical are the sections where masonry joins a superstructure of wood, which sometimes occurs on dormers in residence construction. In such places wire fabric should lap the masonry at least 12 inches, or more if necessary to secure firm nailing into the joints. Stucco panels in half-timbered construction should be flashed at the top, if exposed, and always at the bottom; a rabbet ⅝ inch wide and the depth of the base coats, should suffice on the vertical joints between wood and stucco. Brick veneer over a wooden frame is quite popular in parts of the south, and the method of construction is too well known to warrant description. In some sections of the country stone veneer, 3 or 4 inches thick, is used in much the same manner. Where the cost of masonry is relatively high, a stone exterior can thus be obtained at a price considerably less than that of solid walls.

The use of insulating materials to reduce the heat loss from buildings, particularly those of wood construction, has recently been given much publicity. From the research work of certain progressive companies we have been made appallingly aware of the great heat losses through ordinary types of construction. It should be remembered that the actual loss through the walls of even a frame structure, is only about 25 per cent of the entire heat loss of the building. Approximately 75 per cent of such so-called "waste" occurs through glass areas, around openings, under eaves and through attic floors or roofs. In other words, the application of some proprietary system of insulation to the exterior walls of a country residence, from sill to plate, might be expected to reduce by 5 or 6 per cent the number of heat units required to heat the interior of a moderately well constructed house.

The next article of this series will treat of floor and roof construction.

NOTE. *The author wishes to acknowledge his indebtedness to these firms and associations for their assistance in the preparation of this article: American Face Brick Association; Indiana Limestone Company; A. C. Horn Sales Corporation; Structural Waterproofing Company; and Toch Brothers.*

SOLVING THE ELEVATOR PROBLEM

BY

THEODOR CARL MÜLLER

TALL buildings offer so many possibilities in the way of arranging mass and in use of materials and the amplification of anything the architect may wish to express, that their habitability, their circulation dependent upon the elevator, may suffer. Through the architect's preoccupation with the building as an expression, the elevator, which appears to be entirely within the province of the engineer, remains with many of its architectural possibilities unsounded. Formerly it was the continual complaint of the elevator engineer that he was called in at some stage of making scale drawings where his success was handicapped beyond a solution by mechanical skill. It is much to the credit of the manufacturers that they have largely overcome this condition through their continued efforts to coöperate with the architect at the outset, and through their maintenance of a staff of experts and specialists in service determinants, whose aid the architect may enlist previously to the contracting for an elevator system. One views with hope a closer coördination of function and expression as a single factor dependent upon human want.

The service aspect of an elevator system finds an immediate index to its success in the popularity of the building and the consequent rentals in relation to competing buildings with superior elevator systems. Unless passengers are to be shot upward in a radically different way, the possible limits of speed have been reached. By increasing the velocity of the car over 600 feet per minute, it was found that the operator could not reduce the round trip time because of the premature slow downs necessary for a safe landing. But with the introduction of automatic operation, a velocity of 900 feet per minute was feasible and time lost in landing was completely eliminated by use of micro-leveling apparatus. Greater velocity would be neither comfortable nor profitable in view of the added installation and operating costs. The further development of speed lay in the perfection of the signal systems, the closer coördination of the work of the starter and the despatcher with the individual operators, and the greater efficiency due to by-pass switching for crowded or delayed cars. Here, too, the development has gone so far that greater speed is dependent upon facilitating, through design, the recognition of the signals by the public.

Of great credit to the service in general has been the avoiding of accidents, nine-tenths of which are now landing and door accidents. Carelessness is the chief cause of these, but to further fool-proof the system, solid doors with hydraulic or air checks and solid gates may be specified, and the sizes of door openings be diminished. Free the operator mechanically from the hand operation of both car and door, so that he may devote himself to guarding against carelessness on his part and on the part of the passengers. The expense of such improvement would be somewhat lessened by a reduction of insurance costs. The possibility of general improvement of the system, therefore, lies chiefly in bringing the designer's skill to deal with the features so well secured by the engineers, in collaborating more fully on future evolution, and in the care taken with car interiors and with exterior doors, which by their very nature as design problems, have been widely abused by thoughtlessness and incompetence.

Determinants. General service determinants limit discussion because of their dependence upon the individual building and also because the hypothetical case, as much as the actual, demands the specialized knowledge of an expert versed in probability theory and load plotting. Coupled with an expert solution, goes the speculation of the building committee as to what may develop over a period of years, the type of occupancy, altering perhaps the amount of rentable area, and giving a different quality of service. Single tenant occupancy may result in a great increase of inter-floor traffic, as well as in unusual peak loads. The impracticability of designing for the abnormal traffic of a rush hour forces a choice between congested and delayed service and the stagger system, a remedy which gains the popularity of the public but slowly. Its desirability is obvious, but experience has found it to be in conflict with the human gregariousness which, for example, makes a person prefer to ride in a packed subway with a friend than to sit alone. The business habits of a tenant may cause tremendous peak loads at nine, at noon and at five. While it would hardly be economical to condition a service by the peak loads in the proximity of a railroad terminal where delays cause the missing of trains, concessions to the evening rush hour may prove profitable. In buildings for professionals, the "in and out" curves will not rise to such abrupt heights at nine and five as in those tenanted by organizations whose staffs are made up chiefly of clerks and stenographers. However, the natures of the professional's clients are a vital determinant. The ailing human being, no matter how desirous of receiving the attention of a doctor or a dentist, should not be whisked upward at a

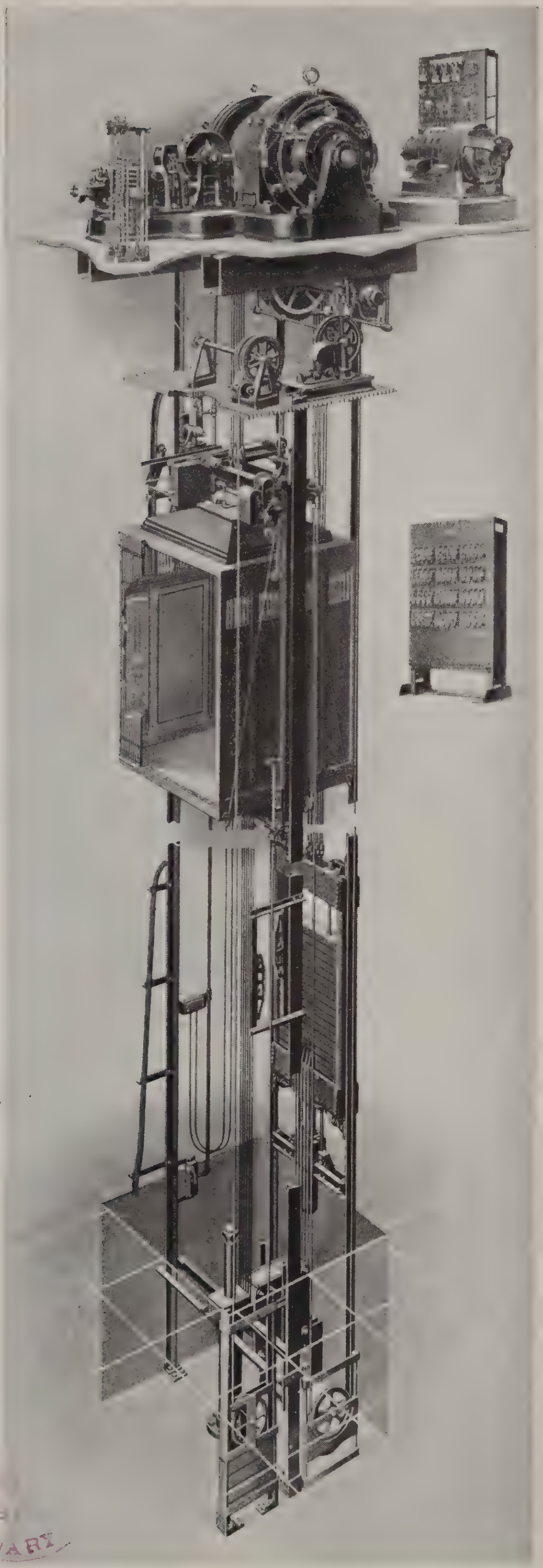


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Diagram of Automatically Operated High Velocity Elevator

rate of 900 feet per minute and should be let down with extraordinary care, while the worried man hastening to his lawyer, cannot be judged on the basis of "normal patience."

Just what "normal patience" is, how long the intending passenger will wait for a car, and how long he can be expected to stay in a car without tax on that patience, is debatable. In general, service with a 20-second interval between cars has been found satisfactory, and that with a 30-second interval is considered fair. The passenger entering the building will be more satisfied to find a waiting car at the lobby floor than to find a bank of closed doors, for the seconds waiting *in* a car seem shorter than those waiting *for* it. Without an actually proposed building with all its elements known and the speculation about its future established, even the expert could not be expected to decide what would be successful interval and round trip time, nor could he make "in and out" studies from which the number and speed of elevators could be computed. Likewise, without a known location, no judgment could be passed on the proportion of area cost to service cost.

Square footage rentals may influence the planning of a building to such an extent that no expense need be spared in minimizing the area occupied by elevator shafts. The saving of several square feet on each of 40 floors may appear finally as a matter of astounding importance in the annual rental. But where this is not the case, the balance is a delicate matter. The added convenience of all that modern developments can offer is not as readily evaluated as square footage saving, and the building owner is likely to err on the side of immediate economy, incurring the risk to his building of the strong competition of a neighboring, fully equipped structure.

The greater cost of installing high velocity cars, with micro-leveling devices and automatic doors, carries with it an increased power cost, an appreciable factor in the building's overhead. This balances against a service impaired by inching to the landings and the operator's gradual fatigue in handling doors.

Circulation Area. The ground floor plan controls elevator accessibility and involves the handling of peak traffic. By comparison, planning the upper floors is hardly problematical. The advisability of segregating the intending passengers from the through lobby traffic and general ground floor circulation is obvious and has resulted in use of the highly effective blind wing corridor. Good practice in blind wing planning divides the elevators into groups of six or eight, arranged on both sides of a short corridor, each wing taking a proportionate amount of the traffic by serving but a portion of the building. These corridors open from a general lobby, which facilitates the directing of passengers and the signal coördination of the starters and despatchers. A starter's indicator panel is indispensable in a large installation and should be centrally located.

When the architect has arrived at successful space distribution of the ground floor circulation, an equally successful time distribution remains to be developed. From the scheduled rate of reception and discharge of passengers, circulation areas are dimensioned with the aid of such empiricisms as the allowance of a 4-foot aisle for every 50 persons passing per minute, adding a 2-foot clearance in front of walls or free-standing columns and a 4-foot standing room space before booths and elevators facing the aisle. Where circulation area is closely computed, crowding may be extremely detrimental, and nothing endangers functioning more than multitudes arriving at one time. The need for time distribution resulted in the use of revolving doors, because of their known capacities. For example, an ideally dimensioned revolving door, 7 feet, 6 inches in diameter, admits a maximum of 50 people per minute. Prejudice against the revolving door, because of its unpopularity with the public, especially where it must admit a large percentage of women and children, and because some building laws forbid its sole use, has led to control by careful adjustment of narrow entries.

The determination of just what elevator equipment will do after installation has developed far beyond its early mystery, and yet it is not subject to any strict formula. By experience and the specialized knowledge of probabilities, there is being rendered service that agrees closely with the lines of theoretical calculations.

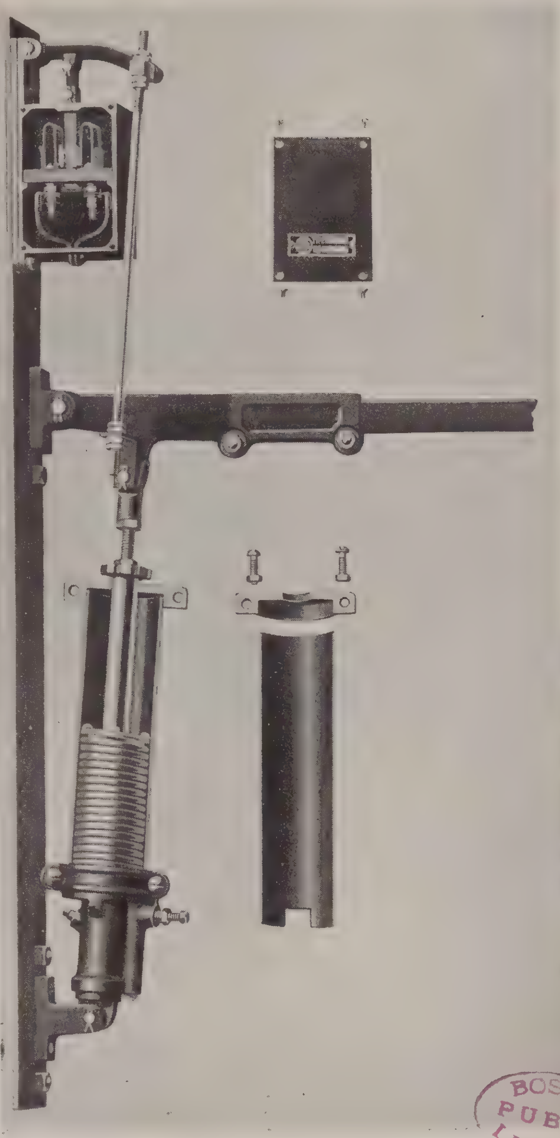

Diagram of Landing Door Check

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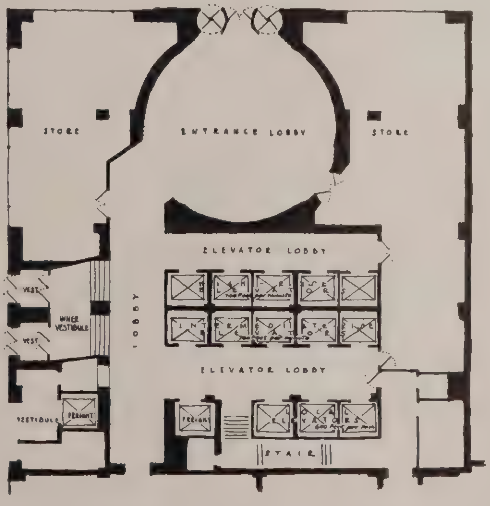
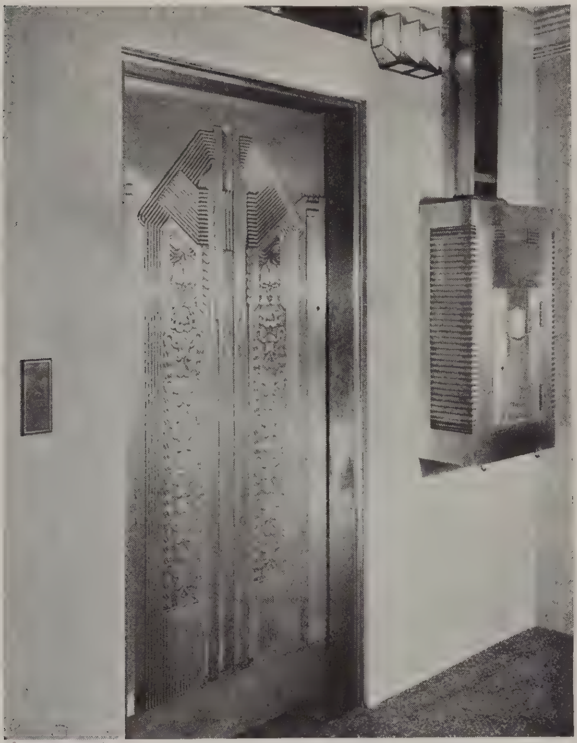


Daily News Building, New York
John Mead Howells and Raymond M. Hood, Architects

Retaining the visibility of doors becomes a problem as circulation areas are minimized, corridors narrowed, and sight line angles reduced. Later, under the designing of individual features, an attempt will be made to show how dependent is the service upon the collaboration of the human element, and how much the human being can be influenced by design to collaborate automatically.

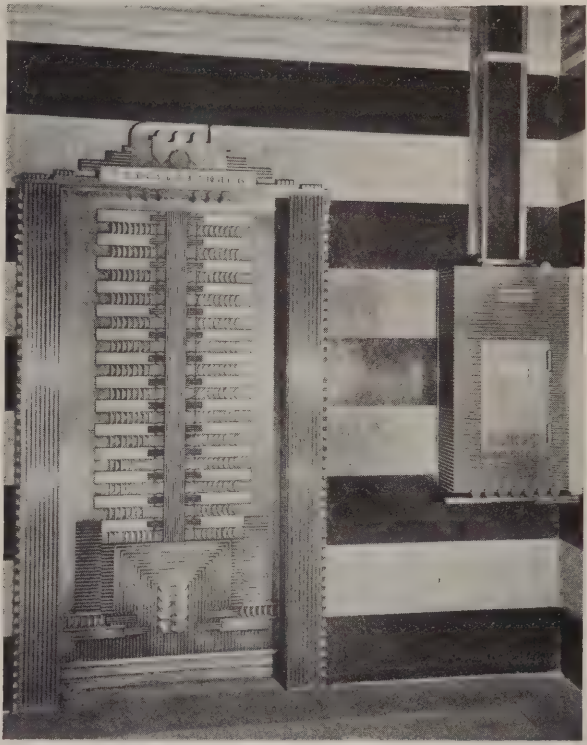
Considering here the factors bearing chiefly on the plans and early scale drawings limits discussion to the actual structure. By far the most practical method of rendering the elevator entrance readily seen and accessible is the use of splayed jambs. Theoretically an arrangement of entrances on the arc of a circle or the use of converging walls in the blind wing plan would obviously accelerate circulation, and it might become general practice were it not for complications in construction and the planning of upper floors. Fortunate-



Photos, Sigurd Fischer

Elevator Doors, Federation Building, New York

Buchman & Kahn, Architects



Elevator Doors, Film Center Building, New York

Buchman & Kahn, Architects

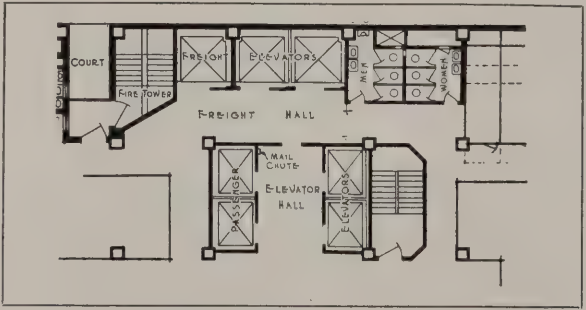
ly, the alignment of six or more elevators in a row has condemned itself, through waste of corridor space and the forced waiting of cars at the other end of the line from the intending passenger.

Shaft Area. To minimize shaft areas in the average tall building contributes more to its success than minimizing circulation area, not only because the shaft saving increases with every story, but also because an excess of corridor space over and above its functional necessity has in the main floor a very real value in contributing dignity and spaciousness. It may afford the only opportunity in the building for architectural treatment.

The elevator corridor of the Film Center has, in the extraordinary motivation of the ceiling, the quality of influencing circulation into the elevators through depression along the axis and, by achieving an acute angle at the intersection with the shaft walls, it emphasizes them with a directional movement upward. As the building increases in height, the percentage of the area devoted to elevator shafts becomes greater, and the profit that might be derived from an appreciable reduction of shaft space becomes considerable. More and more radical reductions will be made, no doubt, to permit an advance in building heights.

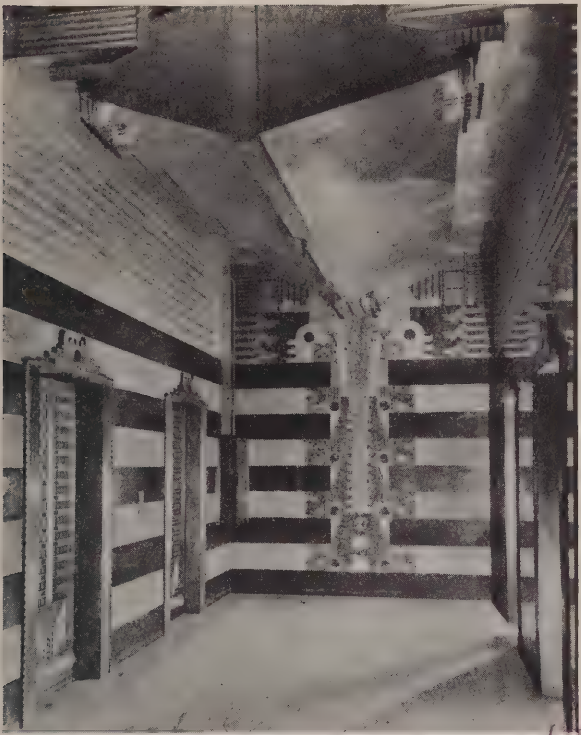
How much the introduction of automatic operation has done is best exemplified in those instances where hand-operated elevators were in use. It is invariably found that fewer automatically-operated cars are an adequate substitute for the hand-operated cars. What future economies will be possible is pure speculation. The healthiest sign, however, is that although manufacturers are loath to prophesy regarding tomorrow's elevator, they are equally reluctant to consider today's elevator as perfected, and they work with its obsolescence continually in mind.

There has been suggested a double-deck car which would serve two consecutive floors at once and terminate in two entrance hall floors, each ramping half its height to the street level. Other proposals involve the idea of there being more than one car per shaft. A local might serve the first 20 floors of a building, following an express serving the upper 20. Safety from collision is insured by the use of electro-mechanical guard and blocking devices, similar to those used on electric railways. Or else three locals might run opposite



Elevator Plan, Film Center Building

Buchman & Kahn, Architects



Photos. Sigurd Fischer

Elevator Lobby, Film Center Building, New York

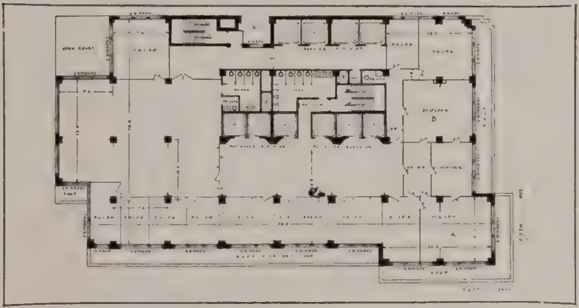
Buchman & Kahn, Architects

Elevator Lobby, 261 Fifth Avenue, New York

Buchman & Kahn, Architects

an express, stopping at terminal floors, blocking devices making it possible for both an upper and a lower car to stop at the same terminal floor without danger. The desirability and simplicity of these proposals come into question when the engineer begins to attack the problem of getting lifting power to the cars. The hydraulic car and the climber were superseded by the counter-weight cable car, where the foot pounds of power have direct relation to the number of passengers and are not wasted on the weight of the apparatus.

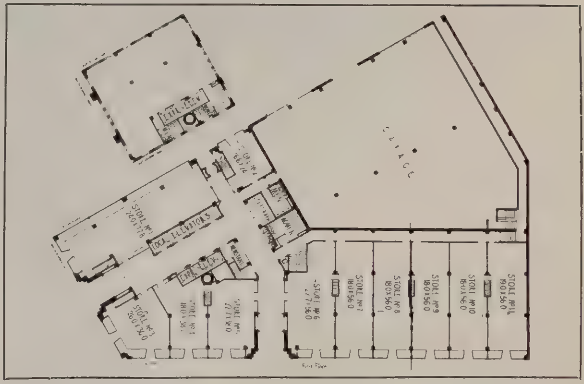
Regardless of drastic diminution of shaft requirements, the number of inches involved in the solution of the ideal car size remains significant. The fallacy of using increased depth is indicated in the time lost when a person at the rear of a crowded car attempts to get off. Using an increased width has the same objection if the door is narrow, but with the wide door, the operator has less control over passengers and encounters forced waits, due to jamming and overloading, especially on the upper floors where there is no starter, and this aside from exposing the system to the danger of the entry accidents already mentioned. Somewhere between these extremes the ideal car size is to be found, and it is influenced by the size of the building and the speed of the scheduling. Ostensibly the small car making rapid trips is better suited to tall, narrow buildings, and the larger car is adapted to a building of less story height, where several passengers are likely to get off at the same floor. The most desirable car sizes range between 7 feet wide and 5½ feet deep, and 7 feet wide and 6½ feet deep. The highly successful installation in the Equitable Building, New York, includes a car 6 feet, 10¼ inches wide by 5 feet, 2½ inches in depth. Often in one building of the set-back type, several differing sizes are used, the high-rise cars smallest, the intermediate-rise cars of medium size, and the locals quite large. In the State Tower Building, Syracuse, the expresses running from the 10th to the 21st floors are smaller than the locals running only to the 10th. In this building one finds an excellent example of the use of the "combination car." Isolated by a separate signal system, this car does the freight work during the day and is most advantageous for the night duty of passengers and



Typical Floor, 261 Fifth Avenue, New York

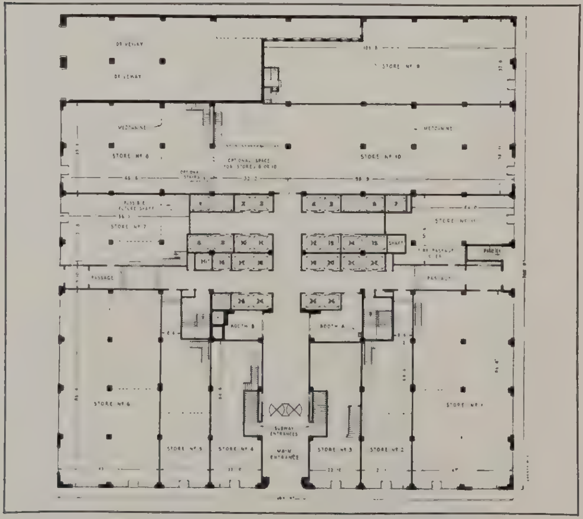
Buchman & Kahn. Architects

State Tower Building, Syracuse
Thompson & Churchill, Architects



Ground Floor; 18th Floor Plan Above
State Tower Building, Syracuse
Thompson & Churchill, Architects

freight. During rush hours it may be switched into the general signal system and aid in coping with the peak loads. It is the one car that serves every floor. The shaft doors serving the "combination car" slide as the others and may swing open to permit entrance to the full breadth of the car. The architects permitted the dimensions of this door to control that of the others, because it made possible uniformity of design and greater domination of the corridors. The shaft is from 8 to 12 inches in excess of the car dimensions on three sides. The floor entrance doors are generally constructed with jambs that approximate the width of the car, but the actual opening is controlled by the sliding doors which are permitted to open but from 3 to 3½ feet, a dimension which has been found generally satisfactory.



Park Avenue Building, New York
Buchman & Kahn, Architects

In dealing with a proposed building whose future is made uncertain by a host of probabilities, the architect should take into account the possibility of there being a demand for more elevators, and should show on his plans the location of future shafts that there may be no conflict with the steel or with the general functioning of the plans if additional elevators should be found necessary at a later date. The Park Avenue Building, New York, presents an admirable example of planning where almost any variation of usage can be accommodated. The plan permits of a possible future shaft, and in addition to an installation of 26 elevators, it includes three blank shafts to care for future wants.

Significant to the importance of these elevators is a quotation from the architect, Ely J. Kahn, writing on the "Economics of the Skyscraper": "The height of the building was determined through a table of calculations largely affected by the number of passenger and freight elevators serving the various floors. The set-back conditions, column centers, standpipe regulations, stairways, toilets and the like, fixed the extent of the service portions, and the relations of the usable space to the unproductive area determined reasonably soon at what floor to stop."

The danger of writing of the elevator problem lies in departing from generalities. One corporation found regretfully that the dissemination of data led more to a misconception of the problem than any aid to its solution, and now it devotes all of its energies to working with the architect.

The author wishes to acknowledge the courtesy of the Otis Elevator Company in providing the diagrams on pages 760 and 761.

SOUNDPROOFING APARTMENT HOUSES

PART II

BY

V. L. CHRISLER
ASSOCIATE PHYSICIST, U. S. BUREAU OF STANDARDS

A PREVIOUS paper upon this subject, published in The Architectural Forum for January, dealt with the methods by which sound is transmitted through partitions of apartment houses and discussed some of the changes in construction that were desirable to obtain better sound insulation. It is the intention in the present paper to give numerical data on some of the more common types of construction and to explain what is meant by the results.

Methods of Expressing Results. All of the results referred to in this paper have been obtained by the use of the telephone as a detector and measurer of sound energy. The indications of this instrument are given on what is called the "physical scale," which measures the energy of the sound wave. But the instrument most universally used for detecting sound and estimating its intensity is the human ear, and unfortunately the ear does not respond according to the physical scale. As the intensity of a sound increases steadily on the physical scale, the response of the ear fails to keep pace with it. There appears to be in the ear a regulating or protective mechanism whose nature is not understood, which, like the well known mechanism of the eye, protects the organ against excessive stimulation. Experiment shows that the response of the ear is proportional to the logarithm of the physical intensity, that is, energies proportional to 10, 100 and 1,000 would produce in the ear effects proportional to 1, 2 and 3 respectively. This logarithmic scale has sometimes been termed the "ear scale." The telephone engineers[1] for some time have been using a scale expressed in sensation units. This scale merely multiplies the numbers on the ear scale by 10, the unit of this new scale being that fractional change in intensity which is approximately the smallest that the average ear can detect. For this reason this unit is called a "sensation" unit. In the example given, the intensities corresponding to 1, 2 and 3 on the ear scale would be represented by 10, 20 and 30 sensation units. Wallace Waterfall, in a private communication, has suggested the illustration of the values of the sensation units in familiar terms. We may call it an "ear sensation scale" (Fig. 1).

Ear Sensation Scale. When considering a partition as a sound insulator, one wishes to know by how many sensation units a sound will be reduced when listened to through the partition. To illustrate this, suppose we refer to the ear sensation scale. Assume the intensity of a sound to be 80 sensation units, but when listened to through the partition it is 30. The reduction factor in sensation units of the panel would be the difference between 80 and 30, or 50.

Discussion of Results. The present paper gives the results of sound transmission measurements on a number of panels representing the usual types of construction. Table 1 gives the results of sound transmission at four different frequency bands, and also the average. Panel 30c gives an example of a double wall. The sound insulation is considerably more than it would have been if a single panel of the same weight had been used. Panel 59a is another illustration. In this case the panels were tested in a horizontal position, the upper panel being supported at the four corners by wooden blocks. Panel 59b was the same as 59a, except that hair felt pads were placed above and below the wooden blocks supporting the corners of the second panel. The air space was the same as for 59a. The pads improved the sound insulation by approximately seven sensation units. An improvement of about this much can generally be expected by the use of pads, providing no nails are driven through so as to spoil the effect of the pad as a sound insulator.

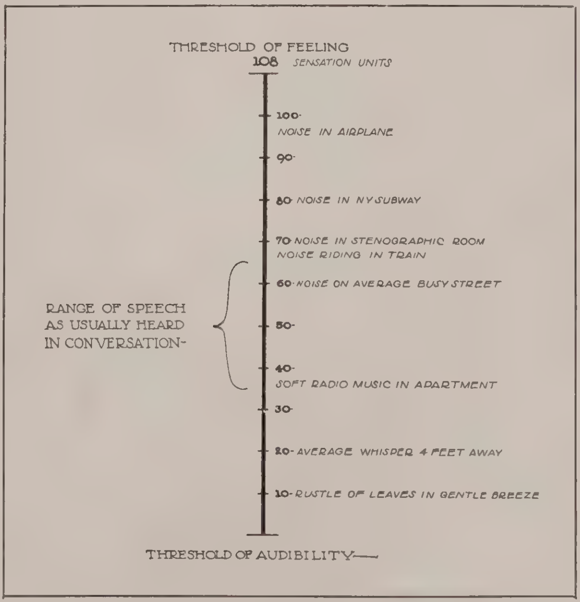

THRESHOLD OF FEELING
108 SENSATION UNITS
100-
NOISE IN AIRPLANE
90-
80 NOISE IN NY SUBWAY
70 NOISE IN STENOGRAPHIC ROOM
NOISE RIDING IN TRAIN
60-NOISE ON AVERAGE BUSY STREET
RANGE OF SPEECH AS USUALLY HEARD IN CONVERSATION-
50-
40-
SOFT RADIO MUSIC IN APARTMENT
30-
20-AVERAGE WHISPER 4 FEET AWAY
10-RUSTLE OF LEAVES IN GENTLE BREEZE
THRESHOLD OF AUDIBILITY

Fig. 1. Diagram Illustrating the Values of Sensation Units

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[1] Fletcher: Bell Telephone Laboratories, Reprint B-152-1, *Journal Franklin Institute,* September, 1923.

DESCRIPTION OF PANELS					REDUCTION FACTOR IN SENSATION UNITS FOR FREQUENCY BANDS INDICATED					
Panel Number	Kind of Studding	Kind of Lath	Kind of Plaster	Plaster Coats	Panel No.	250–257	1000–1087	2000–2570	3000–3470	Average
3	Wood	Wood	Lime	Scratch and brown coats only	3	58.9	64.2	76.6	76.6	69.1
4	Wood	Wood	Gypsum	Scratch and brown coats only	4	43.7	39.3	50.7	53.9	46.9
5	Wood	Wood	Lime	3 coat smooth finish	5	53.8	50.6	67.0	72.0	60.9
6	Wood	Wood	Gypsum	3 coat smooth finish	6	31.4	42.9	42.1	54.5	42.7
9	Wood	Metal	Lime	Scratch and brown coats only	9	62.9	63.2	74.7	73.3	68.5
10	Wood	Metal	Gypsum	Scratch and brown coats only	10	51.7	51.7	53.9	57.5	53.7
11	Wood	Metal	Lime	3 coat smooth finish	11	55.3	61.0	63.9	67.5	61.9
12	Wood	Metal	Gypsum	3 coat smooth finish	12	53.1	53.1	55.0	58.9	55.0
13	Wood	Wood	Lime	3 coat sand finish	13	50.5	54.6	61.4	61.7	57.1
14	Wood	Wood	Gypsum	3 coat sand finish	14	51.0	43.9	57.5	60.0	53.1
15	Wood	Wire	Lime	3 coat smooth finish	15	58.7	61.3	61.6	59.7	60.3
16	Wood	Wire	Gypsum	3 coat smooth finish	16	49.0	47.5	58.3	59.6	53.6
18	Wood	Plaster board	Gypsum	3 coat smooth finish	18	52.6	50.5	55.2	57.5	53.9
22	Metal	Metal	Gypsum	Solid partition	22	42.1	44.5	49.1	49.0	46.2
26	Brick 4″	None	Gypsum	Brown coat smooth finish	26	46.4	48.8	58.4	61.3	53.7
28	4″ Clay tile	None	Gypsum	Brown coat smooth finish	28	39.1	35.7	59.3	57.0	47.8
30b	3″ Gypsum tile	None	Gypsum	Brown coat smooth finish	30b	43.1	39.3	42.1	43.5	42.0
30c	Double wall gypsum tile	None	Gypsum	Brown coat smooth finish	30c	52.6	56.1	65.3	73.5	61.9
39	Wood	Wood	Lime	3 coat lime and Keene's cement, smooth finish	39	53.5	60.7	71.6	57.1	60.7
50	Wood	Gypsum wall board	None		50	43.5	46.4	48.7	39.7	44.6
55	Wood	½″ Fiber board, one side	None		55	23.1	24.9	29.6	29.3	26.7
57	Wood	Gypsum wall board, one side	None		57	34.8	33.4	35.1	30.7	33.5
59	Metal	Metal	Gypsum	Solid partition						
59a	Metal	Metal	Gypsum	Two solid partitions air space between	59a	35.7	50.0	62.4	68.2	54.1
59b	Metal	Metal	Gypsum		59b	48.5	50.9	72.4	72.0	61.0
59c	Metal	Metal	Gypsum	Two solid partitions hair felt between	59c	49.0	51.3	71.5	69.0	60.2
59d	Metal	Metal	Gypsum	Two solid partitions seaweed between	59d	49.4	49.4	74.7	70.1	60.9
59e	Metal	Metal	Gypsum	Two solid partitions fiber board between	59e	54.1	54.6	75.6	71.9	64.1
60	12″ Clay tile (2 unit)	None	Gypsum	Brown coat smooth finish	60	49.4	37.0	55.2	53.6	48.8
62	8″ Clay tile	None	Gypsum	Brown coat smooth finish	62	44.3	48.9	58.0	53.2	51.1
63	6″ Load bearing, clay tile	None	Gypsum	Brown coat smooth finish	63	38.8	46.6	53.5	54.7	48.4
64	6″ Partition clay tile	None	Gypsum	Brown coat smooth finish	64	41.2	45.1	52.1	52.7	47.8

Table I. Results of Sound Transmission Tests

Panels 59c, 59d and 59e show the effect of introducing material into the air space. Panels 59c and 59d give the same sound transmission within experimental error as 59b. Panel 59e shows some improvement,—approximately three sensation units. This improvement would hardly appear sufficient to justify the additional cost. The results from this group of panels indicate that practically all of the sound energy was transferred from the first surface to the second through the corner supports, and that if filling material is introduced loosely into the air space in such a wall, it has little if any value in improving the sound-insulating qualities of the wall. This agrees with the results found by Paul Sabine[2] for hair felt. It has been a common assumption with builders that good (felt) heat-insulating materials are likewise good sound insulators. Experiments do not bear this out. In some cases there is a slight improvement in sound insulation. In many cases there is no improvement, and in a few cases a filling material which is a good heat insulator may actually decrease the sound insulation. Various attempts have been made to improve wood stud construction so as to obtain better sound insulation, but none of the structures tested have proved to be better than some of those given in Table 1. For masonry construction there are apparently three methods for improving the sound insulation: (1) The wall can be made very heavy, but in many cases this is not practicable. (2) A double wall can be built as illustrated by 30c. This wall gives very good sound insulation; it is not excessively heavy, but is rather difficult to build, as it is essential that mortar should not be dropped into the air space and thus form a tie between the two walls. (3) The wall can be built in layers as described in the first paper (January, 1929). The numerical results for this work are not available at the present time, but the indications are that they will be about the same as for a double wall.

In addition to transmission measurements made with the telephone as a sound detector, a good many audibility tests have been made by different observers of the Bureau of Standards with different panels under test. From these observations some general statements as to the meaning of the reduction factor might be made by classifying the panels in four groups:

1. Panels whose reduction factors are *over 60 sensation units.* Conversation carried on in an ordinary tone of voice is reduced to inaudibility in passing through the panel. If there is an external noise in the listening room, a shout on the other side of the panel would be practically unnoticeable.

2. Panels whose reduction factors lie *between 50 and 60 sensation units.* Conversation in ordinary tones heard through the panel is barely audible but unintelligible. If the voice is raised, it may become intelligible.

3. Panels whose reduction factors lie *between 40 and 50.* Conversation in ordinary tones heard through the panel is quite audible, but difficult to understand. If the voice is raised, it becomes easily intelligible.

4. Panels whose reduction factors are *less than 40.* Conversation in ordinary tones is distinctly audible and intelligible through the panel.

These comparisons are based on tests in a listening room in which there was no noise, and which was quite reverberant. In a room furnished with rugs, draperies or other sound-absorbing objects, the result would be apparently more effective than when tested in bare rooms. Attention must also be called to the effect of external noises. If a panel having a reduction factor of between 30 and 40 sensation units is taken as an example, these facts may be noticed. If there is no external noise, and if the panel acts as the wall between two rooms which are fairly reverberant, it is quite easy for two people who are on opposite sides of the panel to carry on a conversation; but if there is the slightest noise in the room where the person is listening, the conversation becomes a mumble, and the chances are that not a single word will be understood. The louder the noise in the room, the greater the masking effect.

From this it is readily seen that a partition might give entirely satisfactory results under some conditions while under other conditions it would be unsatisfactory. In other words, when choosing the type of partition to give proper sound insulation, two things should be known,—the intensity of the sound which it is desired to reduce to inaudibility, and the minimum intensity of the sounds present in the room where the listener is located. For instance, very slight noises in this room might mask any sound having an intensity of 20 or less sensation units. If the noise which we wish to reduce to inaudibility has an intensity of 70, the wall or partition should have a reduction factor of 50. This will reduce the sound to an intensity of 20 units, and this would be masked by the other noises present so as to be inaudible. If the room is absolutely quiet, it will be necessary to have a partition with a reduction factor of 70 to reduce the sound to inaudibility. Whether a partition is satisfactory or not, therefore, depends upon the intensities of other noises present as well as upon the sound-insulating qualities of the partition which is built.

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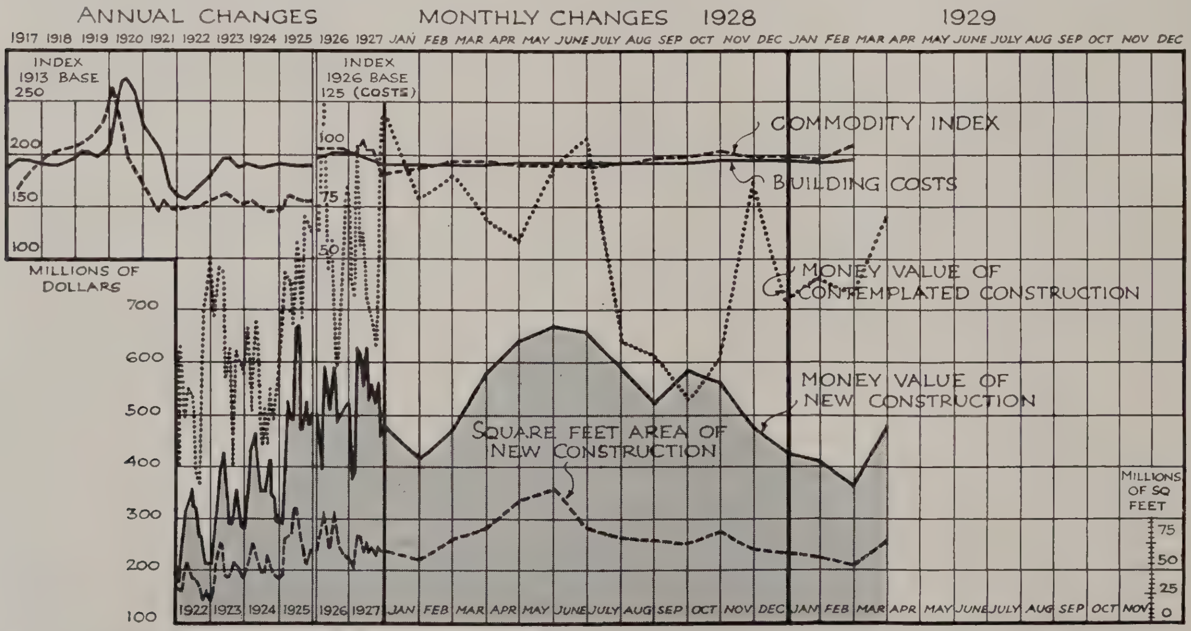
[2] Paul Sabine "Architectural Acoustics," *The Armour Engineer,* May, 1926. He also found that heavier materials, such as sawdust and slag, increased the sound transmission.

THE BUILDING SITUATION

A MONTHLY REVIEW OF COSTS AND CONDITIONS

THE money value of construction contracts awarded in the 37 eastern states during the month of March is given by the F. W. Dodge Corporation as $484,847,500. This represents an increase of 34 per cent over the value of contracts awarded during the previous month, but a decrease of 18 per cent from that of March of last year. For the first quarter of 1929 the total given is $1,256,089,300 which is 15 per cent below the figures for the first quarter of 1928. In the section which includes New York and northern New Jersey, the March contract total of $111,539,200 exceeds that of February by 49 per cent, but it was 27 per cent below the total for March of 1928. For the quarter the 1929 total showed a decrease of 32 per cent from that for the corresponding period of 1928. The New England March construction total was $31,970,300, an increase of 21 per cent over February and a decrease of 24 per cent from that of March of last year. The contracts for the first quarter amounted to $87,719,400, which was 13 per cent below the total for the corresponding quarter a year ago. The Pittsburgh district showed improvement of 10 per cent for the first quarter of 1929, with a total of $160,372,700, as compared with the first quarter of 1928. The March figures of $52,965,900 were 6 per cent above those for February, but 31 per cent below March, 1928. An even stronger upward trend is shown for the northwest, where the March total of $5,494,300 exceeded that of February by 47 per cent and equaled the total for March, 1928. For the first quarter in this district an improvement of 43 per cent over the first quarter of 1928 is noted, with a total contract valuation of $12,750,200. In the middle Atlantic states, the central west, and the southeastern states, similar trends were in evidence. The middle Atlantic states, with March contracts valued at $59,069,200, showed an improvement of 17 per cent over February, but a decline of 16 per cent from March of 1928. The total for the first quarter, $119,517,700 was 5 per cent below that of the first quarter of 1928. In the central west the March total of $159,609,300 was 61 per cent above February, but 9 per cent below that of the previous March. For the first quarter of 1929 this district lagged 16 per cent behind the figures for the corresponding period of 1928. The southeastern states, with a total of $115,011,400 for the first quarter of 1929, were also 16 per cent behind their 1928 figures for a similar period.



THESE various important factors of change in the building situation are recorded in the chart given here: (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Values of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Corp. and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at the left of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the right of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined, first by the trend of building costs, and second, by the quality of construction.

WALL STREET ENTERS THE BUILDING FIELD

BY

JOHN TAYLOR BOYD, JR.

WHAT part will the architect play in the profound changes which may be impending in construction and real estate, if the movement toward huge scale operation, starting in New York, continues to develop? Recent months have witnessed a startling series of immense mergers, combinations and financial alliances of construction and real estate interests,—including in one case, a group of well known architects. Two of these combinations have provided themselves with the sinews of war in the shape of strong Wall Street backing, and all for the purpose of issuing securities for real estate and construction developments. The successive announcements of these programs were enough to surprise even New York, accustomed as it is to vast enterprises. In the present era, economic changes arrive in an industry with devastating swiftness,—often, alas, catching individuals unprepared. If such is to be the case in the construction field, architects might find it to their advantage to note these recent happenings and to mark whatever future progress they may make. For it is not impossible that the building industry and its allied activity, real estate development, may at last be affected by that trend toward large financial combinations which has become characteristic of American industry.

Chiefly the matters here under consideration are of these three kinds:

1. The launching of the huge real estate-construction-financing organizations and combinations just referred to,—in particular the Beaux-Arts Development Corporation, a syndicate composed chiefly of architects under the presidency of Kenneth M. Murchison, in combination with the U. S. Realty & Improvement Company and its construction subsidiary, the George A. Fuller Company, and with the backing of the National City Bank in a program that is announced in the New York press as contemplating expenditure of $100,000,000.
2. New methods of financing contemplated by these huge organizations, involving issuing securities to the public for both a part of the equity and for the mortgage portions of cost of a building operation, the effect of these financial plans, however they vary in details, being to supply almost unlimited funds at a much lower cost than could be done by conventional real estate methods.
3. The organization of the Real Estate Board of New York Exchange intended to develop a public market for real estate securities of all classes.

Naturally, such a far-reaching development is causing no little discussion,—not to say anxiety,—as to what may be its effects on the building industry and the various interests within it. So far, the new movement does not seem dangerous to the architect, but quite the contrary. In contrast with similar attempts in the past to establish huge construction-financing concerns, in which the architect was eliminated except as an employe, these companies generally retain independent architects for their buildings on a professional basis. Furthermore, since they issue long-term securities against their properties, they have a strong motive for having these properties hold their value during the lives of the issues. On this account they recognize that sound architecture is a factor in giving *investment values* to buildings, as distinguished from a *speculative status.*

But if there is no threat to architecture involved, this cannot be said of some of the other interests in the construction industry,—namely, contractors, promoters, "operators," material manufacturers, and real estate financing organizations. Others among these interests, on the other hand, should profit by a trend toward large scale building. The material manufacturer, for example, will approve of the large transaction, carrying with it large single orders, excellent credit risk and a demand for durability of construction. If the lightning strikes in his direction, it may be in the form of mergers or combines among the 10,000 or more manufacturers of building materials and equipment, if the example of the American Radiator Company-Standard Sanitary Manufacturing Company merger finds imitators. The fact that the stock of these two companies was listed on the New York Stock Exchange is significant in two ways,—first, it invited the merger, and second, it allows the companies concerned to obtain their supplies of capital on the favorable terms which that securities market affords.

One interest, however, may find the competition of these combinations formidable. That is the "old line" mortgage-bond companies and the junior mortgage finance companies, whose charges for discounts may require drastic revision in order to bring the costs of their financing down to the level of that of the newcomers, as will be explained later on in this article. Of course, any such reduction should vastly benefit the building industry. Financing charges in many building operations comprise almost as large an item as do either labor or materials of construction. Fi-

FARRAR & WATMOUGH
ARCHITECTS
ONE PARK AVENUE N.Y. CITY
PROPOSED APARTMENTS
BLOCK BOUNDED BY 9TH-10TH AVENUES AND 23RD-24TH STREETS
NEW YORK CITY
HENRY MANDEL ASSOCIATES Inc.
ONE PARK AVENUE
NEW YORK CITY.

An Example of a Large-scale Project to Cost Approximately $25,000,000

LIBRARY

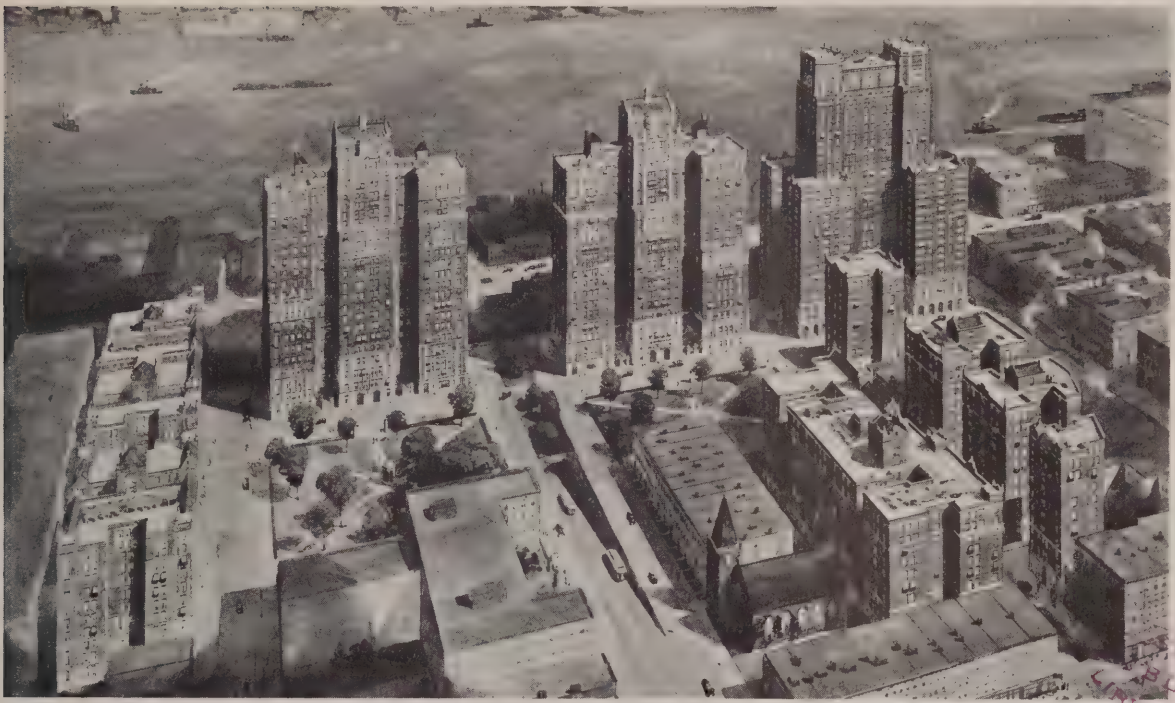
nancing is the one department which offers the greatest opportunity of cutting building costs and thus expanding the market for new buildings. Some of the vast possibilities in this direction I outlined in THE ARCHITECTURAL FORUM for January, 1928,—"Housing, the Responsibility of the Building Industry."

Further possible effects on the various interests in the building world must be left to conjecture as, and if, the movement develops. Obviously, the economic ramifications are too great, and the movement itself is too new, to allow one to make very definite statements as to its ultimate effects. Nevertheless, as a general result, there is likely to occur throughout the industry a drastic scaling down of overhead. The architect also may not escape this turn of fortune's wheel. He might find interesting Mr. Murchison's reply to my question as to how the architect in the smaller towns and cities might fare: "Why not let him put our plan into effect, in combination with the local bank?"

Possibly the new plan will be unfavorable to some real estate promoter or "operator." Today commercial building promotion is generally in the hands of wealthy individuals and their financial following, acting in groups or syndicates, and organized as "private" or "closed" companies, in the language of Wall Street. By contrast, the new method largely,—though not entirely,—transfers the initiative to large "public" corporations which obtain the principal of the cost of a building operation, including a portion of the equity, directly from the public by means of security issues of stock. To anyone familiar with the building industry, this is a significant change.

Another result of these financial plans is to introduce the "chain" principle into real estate, as distinct from the principle of the isolated operation and the "revolving fund" idea. Chains of properties are developed, spreading the financial risk. The chain forms a nucleus for expansion along the lines now familiar in other industries, such as the retail merchandising field. The strength and prestige of the chain allows rapid expansion by making easy the raising of additional capital for each new unit.

This general summary of the new movement becomes clearer in a more specific description of a new organization. The most interesting of the new "mergers" is the combination mentioned of the syndicate of architects, called the Beaux-Arts Development Corporation with the U. S. Realty & Improvement Company and the National City Company. The list of architects who are stockholders in the Beaux-Arts Development Corporation contains familiar names: Benjamin Wistar Morris; Delano & Aldrich; Voorhees, Gmelin & Walker; Charles Z. Klauder; Raymond Hood, Godley and Fouilhoux; John W. Cross; William H. Gompert; James W. O'Connor; and Whitney Warren. There are also four artists and decorators. The construction interest is represented by the George A. Fuller Company, and that of real



View of the Tudor City Group of the Fred F. French Company

estate by Douglas and Roland Elliman and by the U. S. Realty & Improvement Company. The enterprise is backed by the National City Company, which is the securities company of the National City Bank. Obviously, this is a combination strong in every sense.

The first operation of this organization is the Beaux-Arts Apartments, a $5,250,000 project on East 44th Street, Manhattan, near the Beaux-Arts Institute of Design. The architects are the firm of Kenneth M. Murchison and Raymond Hood, Godley & Fouilhoux in association. The Beaux-Arts Development Corporation, the "parent" company, owned the site and contributed it as its part of the project, receiving in exchange second preferred stock in the Beaux-Arts Apartments, Inc., as well as a portion of the common stock, under the novel plan of financing which attracted so much attention in New York when it was announced. The Beaux-Arts Apartment Company is the company formed to put through this single apartment building project. This plan will be described in detail in a later article, along with several others of the sort. At this point it should be noted that the plan involved two major differences from the conventional real estate financing: (a) the mortgages were eliminated entirely, being replaced by an issue of 6 per cent first preferred stock to the amount of 75 per cent of total cost, carrying with it a bonus of the common stock; and (b) the issues were sold by the National City Company and its vast chain of branches and associated investment houses extending all over the country, even to other nations, at an underwriting cost of 5 per cent plus a profit in the form of a bonus of common. This common stock is expected to begin to earn dividends in about 11 years, after a large portion of the preferred stocks is retired. Thus, by using the Wall Street machinery of securities distribution, in this case, the building enterprise obtained the advantages of (1) 75 per cent of the cost at a rate of about 6 1/3 per cent, as compared with a much higher rate charged for a first and second mortgage totaling the same amount, or their equivalent in the conventional mortgage bond issue, in which discounts of from 11 to 18 per cent,—or even more, according to circumstances,—are not unknown, and (3) immediate sale of stock, this particular issue, it is understood, having been sold in *one day*.

But there are two other sides to this triple combination,—that of the U. S. Realty and the National City Bank. The U. S. Realty & Improvement Company was incorporated in 1904, to replace an older concern. Stated in ordinary terms, its field of operation appears to cover nearly all the possibilities of profit in real estate and construction operations. It has various subsidiary companies, including the George A. Fuller Construction Company. The balance sheet of U. S. Realty and its numerous progeny shows total assets of nearly $73,000,000 as of April 30, 1928. Earnings for the year previous were $5,516,302.-

60, equal to $7.52 per share on the common stock then outstanding. U. S. Realty owns several large buildings, including the Plaza Hotel and the Trinity (office) Building, New York. The George A. Fuller Company did a huge construction business last year on the cost-plus fee basis.

Now, in its size and scope of operations, the U. S. Realty & Improvement Company is not, of course, unique. The idea of the large development-financing-contracting company is not new, and examples of it have long been known in various sections of the United States. Familiar instances are the group of engineering-construction concerns, such as the Turner Construction Company, the J. G. White Engineering Company, and Stone & Webster. In the more strictly real estate field, the rise of the Fred F. French organization since the war is familiar. The French Company, in fact, goes even further, in maintaining its own architectural and stock selling departments.

What then is the significance of the U. S. Realty to the building world as an instance of new economic development? The answer is chiefly in its new financial methods. The significance of the U. S. Realty's methods of financing, centering about its alliance with the National City group, is two-fold: (1) possibilities of obtaining capital at low cost for each specific building project, and (2) alternative means of obtaining cheap funds through its listing of its stock on the New York Stock Exchange. The first advantage has been briefly mentioned and will be illustrated more specifically, as noted, in a later article. The second advantage, namely that derived from the "Big Board" listing, appears perhaps most novel to those familiar with conventional building finance. It deserves a brief explanation. On January 1, 1929, U. S. Realty capital consisted of approximately 733,000 shares, no par common, with no senior obligations ahead of this issue of the parent company in the form of bonds or preferred stocks, although there were such obligations and some mortgages outstanding against some of its subsidiary organizations. As noted, this stock earned $7.52 a share for the year ended April 1, 1928, and paid $4 dividends. Stock dividends of 10 per cent each were paid to stockholders in 1925 and 1927. December 31, 1928, the closing price of the stock was 84⅛, the lowest price of the year having been 64¼, on February 4. Its highest price for the year was 93⅝, on May 7.

In these bare, apparently irrelevant, figures there lies a deep meaning. The meaning is, in brief, that shareholders were willing to pay a high price for U. S. Realty, in the hope of reward, not so much in interest return, but in the shape of stock dividends, in rights on new issues, and in the expectation of appreciation of price of the stock itself as the company made money on an increasing scale; also as a result of the favor of its stock among the public, U. S. Realty was able this year (1929) to raise new capital for its various purposes, to the extent of 244,367 additional shares of common stock, which were offered to the stockholders at $80 per share. The point here to be made is the remarkable advantage to U. S. Realty of having its stock listed on the New York Stock Exchange, enabling the company to raise some $19,000,000 new capital on a basis of 5 per cent or possibly a slightly higher rate.

One should not suppose that this apparent drawing of rabbits out of the Wall Street hat is pure financial magic. Notwithstanding the controversy over the gigantic speculation in the security markets, U. S. Realty did supposedly offer something tangible in return for these liquid assets of new capital,—something more than the prospect of speculative appreciation in the price of its stock. These considerations are generally:

1. Liquidity of a ready market.
2. A history of several years' steady expansion in size and earnings, an indication of sound, capable management.
3. Diversification of risk in its operations, conservatively undertaken, in providing a basic necessity of life.
4. Ability to meet competitors on account of the economy of large-scale methods and economical financing.
5. Financial responsibility of the company.
6. Responsible financial statements made public and at stated intervals, as required by the rules of the New York Stock Exchange as a qualification for listing. This is only a part of the spotlight of publicity which beats upon a company whose securities are listed on the "Big Board" where they must compete for the favor of the investing public, advised as it is by an army of investment brokers' experts, against the stock of others of the most powerful industrial and public utility corporations and railroads.
7. Value of stock to investors as collateral, due to its Stock Exchange listing.
8. Partnership in a large, successful company.

Clearly, a huge "public" corporation, seeking the favor of the investment public in a world-wide public market, has its heavy responsibilities, and its own stiff competition to meet, although these may be different from those of the conventional "closed" real estate company. All this responsibility is summed up in the question which the investor asks an investment expert—or his banker: "Which do you think is the best buy at present prices, General Motors or U. S. Realty?"

So U. S. Realty appears to have two strings to its financial bow. Whichever one it chooses to use, the public offers its savings for a low return. How different this is from the characteristic real estate operation! In the usual operation, only the first mortgage proportion of the project's total cost resembles this favorable situation. But, as everyone knows, terrific charges are demanded for junior mortgage discounts, and the junior mortgages must usually be paid off in a very few years. Worse yet, almost anything must be promised to the wealthy "operators" who are solicited for stock participation, or to the go-between who can influence them to join in the venture. In New York a "proposition" must "show a paper profit" of 15 per cent or more, depending on circumstances, to attract capital for the equity. Another defect of the conventional method is that this crushing burden of finance costs comes heaviest in the first few years of the project's history, at precisely the time when it is being established as a going business. Sometimes the load brings foreclosure to a worthy project.

The other familiar effects of this conventional real estate method of financing naturally follow, —namely, the high speculative risk, the pressure to build for quick re-sale, "shoestring" financing, uncertain credit, and minimum financial responsibility of the promoters through the practice of incorporating each building operation as a separate company. Still other evils follow, each aggravating the others and creating a chain of doubtful links. These are low standards of design, of construction, and of building management; high costs of small-scale production; excessive overhead; and, finally, lack of coördination of the various elements in the building industry which coöperate to produce a building, and the splitting up of real estate into a number of small units and holdings. In contrast, the Beaux-Arts Development Corporation and the U. S. Realty & Improvement Company-National City Company combination follows an almost contrary set of principles. Allowing for the difference of conditions in specific cases, which of the two methods is the better? Which, in the long run, will be the more beneficial to the building industry and to the architect? In any case, the new method, which is simply that which is extensively practiced throughout American business and industry, has certain definite advantages in competition. I believe that we are likely to witness a new development on these novel principles, which are those of large-scale operation. They seem to me to be sound and logical, notwithstanding the fact that there are some dangers.

Three years ago, when our organization, as consulting architects, assisted the New York State Housing Board to prepare its practical program, I had an opportunity to study the matter. This plan is set forth in the article "Housing,—the Responsibility of the Building Industry," published in The Forum for January, 1928, already mentioned. Briefly, it was set forth there that the building industry enjoyed an opportunity for unparalleled activity,—on a greater scale, in fact, than anything which the post-war building boom has yet seen,—in developing a large-scale construction program based on low-cost financing through use of the Wall Street machinery, by this means supplying housing to the middle economic third of the population. Now, evidently, these principles of building organization that were first formulated chiefly by architects are coming into actual operation.

Returning to a specific consideration of these new organizations, a brief mention of the other large concerns may be of interest. The Beaux-Arts-U. S. Realty-National City combination has been chosen as the most typical, and in some ways, most interesting. But it is not the only one of its type. A second great combination of somewhat similar character, though possibly more conventional, is the $42,000,000 General Realty & Utilities Corporation. This concern is affiliated on the construction side with the Thompson-Starrett Company, and on the real estate development side with the Tishman Realty & Improvement Company, the stock of both being listed on the New York Curb. General Realty & Utilities, too, has its Wall Street connection. It is backed by a group of investment houses and other public utility interests, particularly Stone & Webster. On its directorate are representatives of six Wall Street investment houses. Organized this winter, this company, pending development of its program, placed $10,000,000 in construction loans advanced to other builders, and lately it has announced a huge new building project on the East River front of Manhattan.

A third large and expanding organization is that of the Henry Mandel Associates. It resembles the Fred F. French Company in its comprehensive activity in all phases of real estate and building, including the sale of its securities by a department of its own organization. However, it is not "its own architect." Its latest announcement is a $25,000,000 block of 16-story apartment houses on West 23rd Street, of which Farrar & Watmough are the architects. This group, planned two rooms deep, covering as it does 49 1/3 per cent of the site area, and containing a great block garden in the center of the plot, 71 feet at its narrowest, is an example of the enlightened policy of this company toward sound architecture. Its financial plan, which involves the principle of selling securities to the public, based on individual building projects and carrying, in addition, a share in the chain of properties contemplated by the Mandel plan, will be explained in a later article.

The Fred F. French Company is more widely

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known, having been established some time, and also being known through its extensive stock selling publicity. Its "Tudor City" development in the Grand Central district of Manhattan covers approximately six acres, extending from 40th to 44th streets and situated between First and Second Avenues. Nine buildings of the apartment or apartment-hotel type are either built or under construction, and a little more than half the site remains undeveloped. There is a huge interior garden equal to two city blocks in the center of Tudor City. The total expenditure in land and in buildings built and now under construction has been about $30,000,000.

It will be noted that both the French and the Mandel organizations do not use Wall Street investment houses to market their securities. Presumably, for their own purposes at least, they market their own stock themselves directly to the public because it is cheaper. Of course, they are thus performing a great task, one that is doubtless possible only because these two concerns operate steadily on a vast scale. In this connection, it is said that the French Company's securities are sold in increasing amounts in the "over-the-counter," or unlisted securities market of New York. This over-the-counter market for stocks has grown greatly in recent years, and is now rather firmly controlled by the Unlisted Dealers' Association, a responsible organization actively interested in preventing abuses in sales of securities. Many stocks of the highest investment caliber, such as the shares of the New York banks, are sold chiefly in this market. Thus it is active, "liquid," and its best securities possess a certain collateral value at the banks. Still another organization is the Lefcourt Realty Corporation, whose stocks are listed on the New York Curb. It, however, does not do its own construction or its own architecture. Shreve & Lamb are the architects for its latest great building, the 38-story office building located on the corner of Fifth Avenue and 43rd Street. In this building THE ARCHITECTURAL FORUM has its new home, in company with other technical and business magazines. Here is still another illustration of the merger movement.

Finally, it may be pertinent to point to the fact that the conventional type of mortgage bond issue has for several years attracted Wall Street investment houses. A number of them have floated some of the largest issues. A typical case is G. L. Ohrstrom & Company, a house active in public utility issues. In its real estate financing, G. L. Ohrstrom has limited itself to office buildings. On the other hand, several of the conventional mortgage bond companies, which formerly specialized almost exclusively in real estate issues, have gone more and more into general security issues. An example is S. W. Straus & Company, whose Fifth Avenue building bears this lettering: "Straus National Bank & Trust Company."

Such is the brief record of a number of interesting developments which may, or may not, indicate a new economic trend in the building world. Time alone can tell the outcome. In any case, the architect should view the movement from two sides. One is the possible effect on the building industry and on architecture, as a whole; the other is the effect on himself. As to the latter, the individual architect is doubtless his own best judge. Let him be prepared for any changes that may come. And as to the former, architects should try to realize (1) the enormous stimulus to building which should result from the greatly reduced costs possible in large-scale operation, in the method of "public" financing, and in the greatly reduced cost of operating buildings in large developments comprising a city block or more; (2) the higher architectural standards incident to long-term security issues; (3) economic stability of large-scale operation to the construction industry; (4) better standards of architecture.

There is, of course, no guarantee of these benefits, but it may be well for architects to lend their influence in the direction of progress and, if the new movement spreads throughout the industry, to do all they can to see that it is rightly handled and kept in strong, responsible hands. Otherwise its effects on the industry might be disastrous.

THE SEVERITY OF FIRES IN BUILDINGS

BY

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ONE of the main objects of public regulation of building construction is to prevent undue hazard to life and neighboring property from fire. Fire exposure arises from interior and exterior origins. The evaluation of the exterior exposure can be done only with difficulty in quantitative terms, and the gradual accumulation of data from actual fires will probably continue as the main guidance in providing the proper protection. The present paper will deal mainly with methods of gauging the severity of fires resulting from the burning out of the contents of buildings whose walls, floors and column constructions are sufficiently fire-resistive to be capable of withstanding a complete burning out of the buildings' contents without collapse of major parts. It is only when the problem is thus restricted that there is much possibility of obtaining experimentally quantitative information pertinent to the answer sought. The severity of fires completely consuming the combustibles of frame buildings and masonry-walled buildings with combustible interior construction is of interest mainly as it concerns the exposure to adjacent or neighboring buildings and the fire exposure on party and fire walls and on record containers. As it concerns the severitv of fires in buildings with interior combustible construction protected with incombustible floor, ceiling and wall finishes, the present discussion will apply up to the limit set by the fire resistance of these protections.

The Standard Fire Test and Building Fires. Indications of the intensity of building fires have been obtained from fused metals and from general fire effects on materials, on the reaction of which to temperature or fire exposure, such as in test fires, information is available. The fire ruins or reports of fires give, however, little information on the duration of the temperatures in a given portion of a building. The absence of data indicating how forms of construction or devices giving a certain record of performance in the standard fire test to be applied as protection against fire conditions in buildings with as much precision as results of strength tests are applied for load-carrying purposes, led me to consider the possibility of conducting burning-out tests in suitably designed structures to obtain the needed information. If such tests could be made to yield quantitative information on the equivalent fire durations to be expected with given building types and occupancies, it would help matters measurably to place the whole matter of fire-resistance requirements on a rational basis. Fire is a contingent condition that may or may not involve a building or given portion thereof in its lifetime. In theory, at least, the owner should be required to make provision for safety to life within and near the building and for protection to adjacent and neighboring property, only as it concerns the building type and size proposed and the type of occupancy for which it is intended. With requirements more or less uniform for all occupancies, the tendency would be to require more than the needed protection for buildings with the lighter occupancies from the fire hazard standpoint, and not enough for those with greater proportions of combustible contents.

Test Structures and Testing Methods. The first building, erected in 1922, was a one-story brick

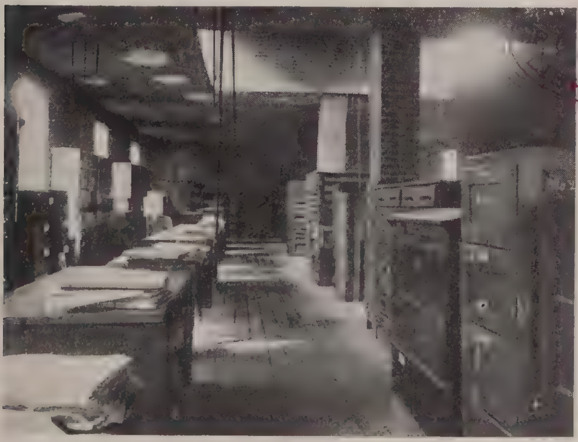

Fig. 1. Interior View of Large Building Before Test With Office Occupancy

Fig. 2. View of Large Building During Test With Office Occupancy

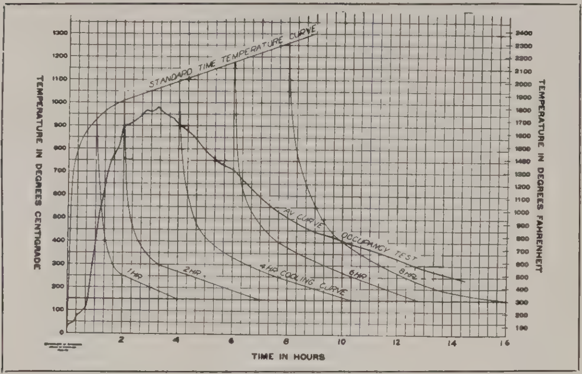

Fig. 3. Standard Furnace Exposure Cooling Curves and Curve From Occupancy Test

and concrete structure, 15 by 29 feet inside and about 9 feet in its dimensions from floor to ceiling without finish. This was filled with discarded furniture and records to simulate an office or light commercial occupancy, a wood top floor on sleepers in cinder fill being provided in some of the tests. The fire was started either in a waste paper basket placed near one of the desks or it was given what approximated an exposure fire start by burning a quantity of oil-soaked wood kindling in a grate about 3 feet in diameter and 7 feet high placed in one corner of the room. A metal shield around it was withdrawn when the contents were burning freely, the temperatures from the resulting hot blast being above the ignition points of wood and paper over most portions of the room. Pivoted shutters in the walls were regulated to give what was deemed to be the proper amount of air for maximum fire conditions within the room. Three tests with wood furniture and records, giving combustible contents inclusive of the wood floor, if present, from 13.1 to 15.4 pounds per square foot (Table 1), were conducted in this building, and also one test with records on wood shelving giving 55.4 pounds per square foot. The tests with office and records occupancy were repeated in a larger building, 30 by 60 feet in plan, with a monitor over the center section to provide draft conditions similar to those produced by an open stair or elevator shaft. This room was deemed to be of a size sufficient to account for

TABLE 1
RESULTS OF FIRE INTENSITY-DURATION TESTS WITH OFFICE AND RECORD ROOM OCCUPANCIES

Occupancy	Furniture	Finish floor	Building	Fire start	Amount combustible materials			Equivalent fire duration		
					Lbs. per sq. ft.	Approx. B.t.u. per sq. ft. of floor area	Approx. B.t.u. per cu. ft. of room volume	150°C. base Hr.-Min.	300°C. base Hr.-Min.	Curve used
Office	Wood desks, files, etc.	Wood	Small	Exposure	14.8	120,000	13,100	1-03	0-47	Average
Office	Wood desks, files, etc.	Wood	Small	Slow	15.4	121,000	13,200	1-26	1-15	Average
Office	Wood desks, files, etc.	Cement	Small	Exposure	13.1	105,000	11,500	1-05	0-54	Average
Office	Wood desks, files, etc.	Wood	Large, E. section	Slow	20.6	166,000	15,800	2-05	1-51	Average
Office	Wood desks, files, etc.	Wood	Large middle section	Exposure	16.3	132,000	11,300	2-01	1-49	Average
Office	Wood desks, files, etc.	Wood	Large W. section	Exposure	20.2	162,000	15,400	2-04	1-51	Average
Office	Steel desks, files, etc.	Wood	Small	Exposure	10.0	76,900	8,400	0-04	0-01	Average
Office	Steel desks, files, etc.	Wood	Small	Exposure	10.0	76,900	8,400	0-09	0-05	Upper
Office	Steel desks, files, etc.	Wood	Small	Exposure	12.0	87,000	9,500	0-35	0-02	Average
Office	Steel desks, files etc.	Wood	Small	Exposure	12.0	87,000	9,500	0-48	0-11	Upper
Record room	Wood shelving	Cement	Large, E. section	Slow	44.0	347,000	33,000	5-10	3-17	Average
Record room	Wood shelving	Cement	Large middle section	Exposure	52.2	411,000	35,400	6-57	5-00	Average
Record room	Wood shelving	Cement	Large W. section	Exposure	49.0	386,000	36,800	8-14	6-21	Average
Record room	Wood shelving	Cement	Small	Exposure	55.4	440,000	48,000	8-44	6-50	Average
Record room	Skeleton type steel shelving	Cement	Small	Slow	48.5	350,000	38,100	5-15	4-40	Average
Record room	Partitioned type steel shelving	Cement	Small	Exposure	49.2	333,000	36,400	5-00	3-41	Average

the effect on the fire severity attributable to room area. A view within this room before test is shown in Fig. 1, and one during a fire test in Fig. 2. The fires were started at one or more points in one (the east) end of this room, the large room size rendering it impractical to attempt an exposure start for the fire as was done in the smaller room. However, as it concerns the middle and farther (the west) section of this room, the fire start can be regarded as equivalent to exposure from the burning of the contents of the section in which the fire originated. Air temperatures were measured at three levels; measurements were also made of temperatures in the debris. In the smaller room between 35 and 40 thermocouples were used for these purposes; in the other about 100.

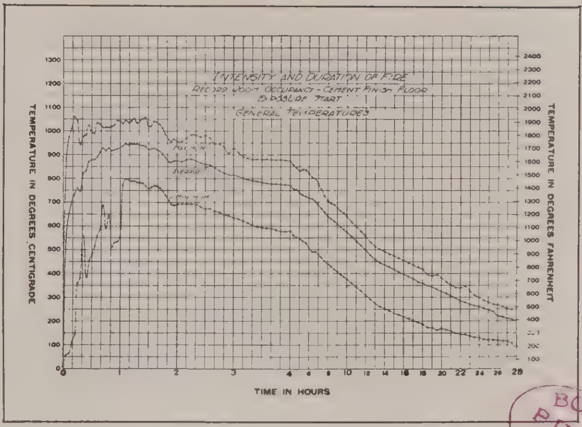

Fig. 4. Time-Temperature Curves From Record Storage Test With Wood Shelving in Small House

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Heat of Combustion of Contents. Besides listing the combustible contents in pounds per square foot, the heat value of the contents is also given in Table 1 in terms of British thermal units per square foot of floor area and per cubic foot of room volume. The heat of combustion of the wood and paper constituting the contents was determined in tests on typical samples.

Reduction of Temperature Data. From the temperatures at the different points in the room the average for the room or a given section thereof is obtained, which, together with the corresponding maximum and minimum temperatures, is plotted against time as abscissa. The data are also reduced to show the average temperatures at the different levels. As a rule, only the average room or section temperature is used in the comparisons to obtain the equivalent fire durations. In the case of the tests with office occupancy and steel furniture, the average temperature for the upper level, 18 inches below the ceiling, was also used.

The standard furnace exposure curve used generally in American fire-testing practice, together with cooling curves obtained from temperature measurements of our furnace chambers after the fire was shut off, are shown in Fig. 3. There is also given in Fig. 3 the average temperature curve from one of the burning-out tests. An approximate comparative measure of severity is obtained by assuming that the area under the latter curve, expressed in degree-hours, gives severity equivalent to an equal area under the standard exposure curve and the cooling curve applicable for the given period. The assumption that equal areas under time-temperature fire exposure curves stand for equivalent severity of exposure is an approximation only, since in the heat conductivity equation applicable for the case, the exposing temperature enters directly as a factor in the expression for the temperature obtaining at any point within an exposed body, while the time, which is the other factor in the time-temperature area, enters as an exponent. However, we have so far found no better measure of comparison than this that can be conveniently applied. It might also be noted that temperature transmission through materials is retarded not only by the heat insulating properties present but also by calcination effects and evaporation of free and combined water, and it appears probable that the effect of the fire exposure in breaking down resistance of the latter type is also measured approximately by the product of exposing temperatures and the time they prevail.

Another point that must be considered in making such comparisons is the minimum temperature that need be considered as an exposing temperature. For the results reported here, 150° C. (302° Fahr.) and 300° C. (662° Fahr.) have been taken as base lines, and only the areas of standard and occupancy test curves above these lines are considered significant. The former is below the ignition points of ordinary combustible materials, and it would not in any general case appear necessary to take into account lower temperatures, even considering that temperatures somewhat higher than the average room temperatures used in the comparison obtain in portions of the room. Where only protection for incombustible structural members is involved, temperatures below 300° C. (662° Fahr.) can probably be neglected where the fire exposures are of the relatively short durations incident to fires in buildings. To make convenient the determination of equivalent durations from burning-out tests, the area to a given base line under the standard furnace curve plus cooling curve, expressed in degree-hours, is plotted against time as abscissa. The area, to the same base line of the time-temperature curve from the occupancy burning-out test considered, is obtained in the same unit, and the equivalent duration of the latter can be read directly from the area-time curve of the standard furnace test.

Details of Tests and Results. All tests from which results were obtained in the form of equiv-

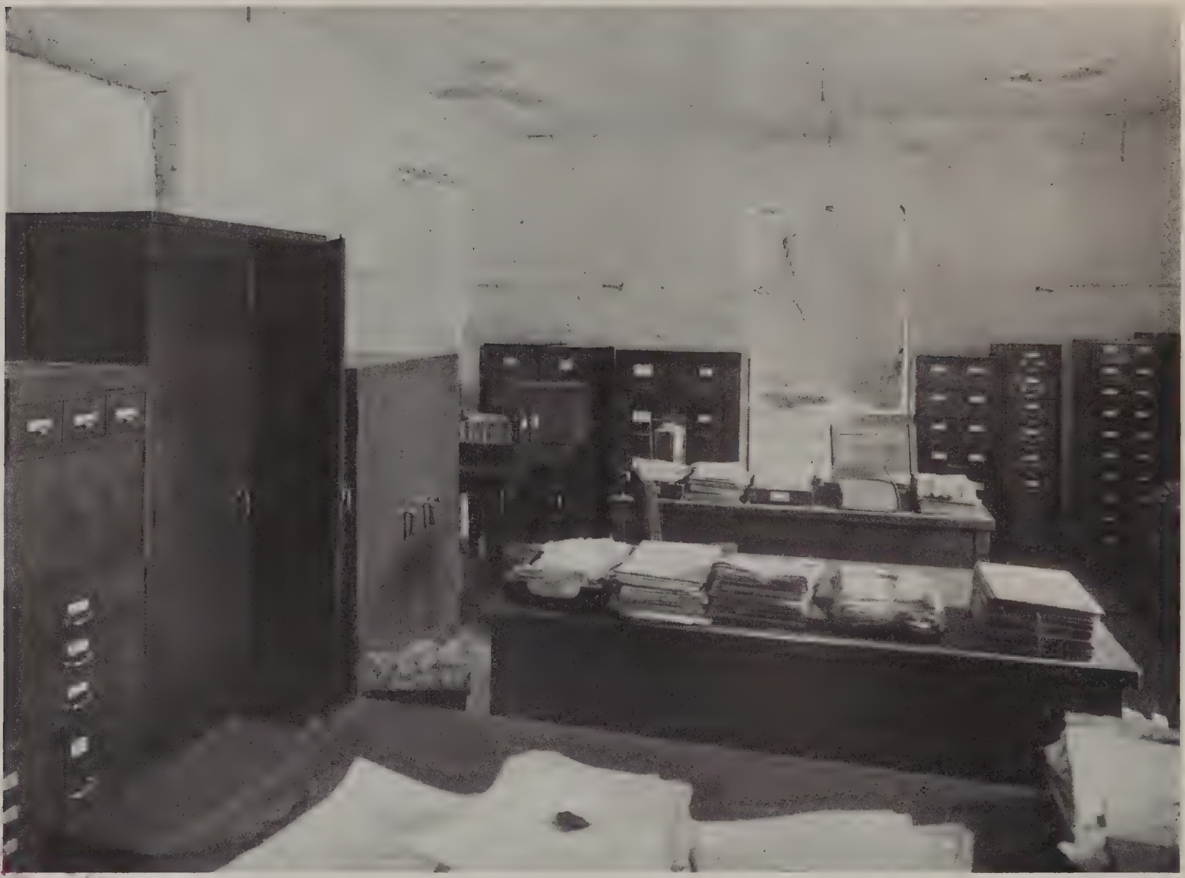

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Fig. 5. Office Occupancy With Metal Furniture Before Test

alent fire durations, are given in Table 1 (page 776).

Office Occupancy; Wood Furniture. As already indicated, three tests of office occupancy with wood furniture were made in the small structure and a similar test with a somewhat larger amount of combustible contents in the larger building. As it concerns equivalent fire durations, the results of the latter test are reported separately for each of three 20-foot sections in the 60-foot structure. These fires resulted in complete burning of contents, including the wood finish floor where present. Time-temperature curves from one test are shown in Fig. 4. The larger room area gave a little greater severity than would be expected from the results of tests in the smaller room, even after allowing for the difference in amounts of combustible contents present. The fire in the end sections of the large building apparently affected the temperatures in the middle section to such an extent as to give it nearly the same equivalent fire duration in spite of the lower content. The vent over the middle section induced air currents that undoubtedly aided in equalizing the room temperatures.

Office Occupancy; Metal Furniture. These tests were conducted in the small building, the furniture consisting of desks, tables, filing cabinets and shelves similar in number and disposition to what was present in the tests with wood furniture (Fig. 5). The total quantity of records was, however, greater by about 25 per cent, and about one half of it was placed on top of tables or in open shelves or cabinets. With cement finish floor no room temperatures above 104° C. (219° Fahr.) developed when fires were started from burning contents of waste paper baskets. The fire was confined to the contents of the open shelves and to other exposed paper adjacent to the origin. With a wood finish floor and a start for the fire in a pile of waste paper, contents of adjacent open shelves and of filing cabinets under which the floor burned out were wholly or partly consumed. The progress of the fire was very slow, 8 hours being required before 30 per cent of the floor was consumed. The maximum room temperatures at the different points ranged from 50 to 230° C. (122 to 446° Fahr.), and except for the slow fire in the finish floor, no general spread of fire occurred.

Two exposure starts for the fire were staged, one with a cement finish floor and one with a wood top floor. In the former, exposed paper over about two thirds of the room was ignited by the blast from the grate, but no general fire

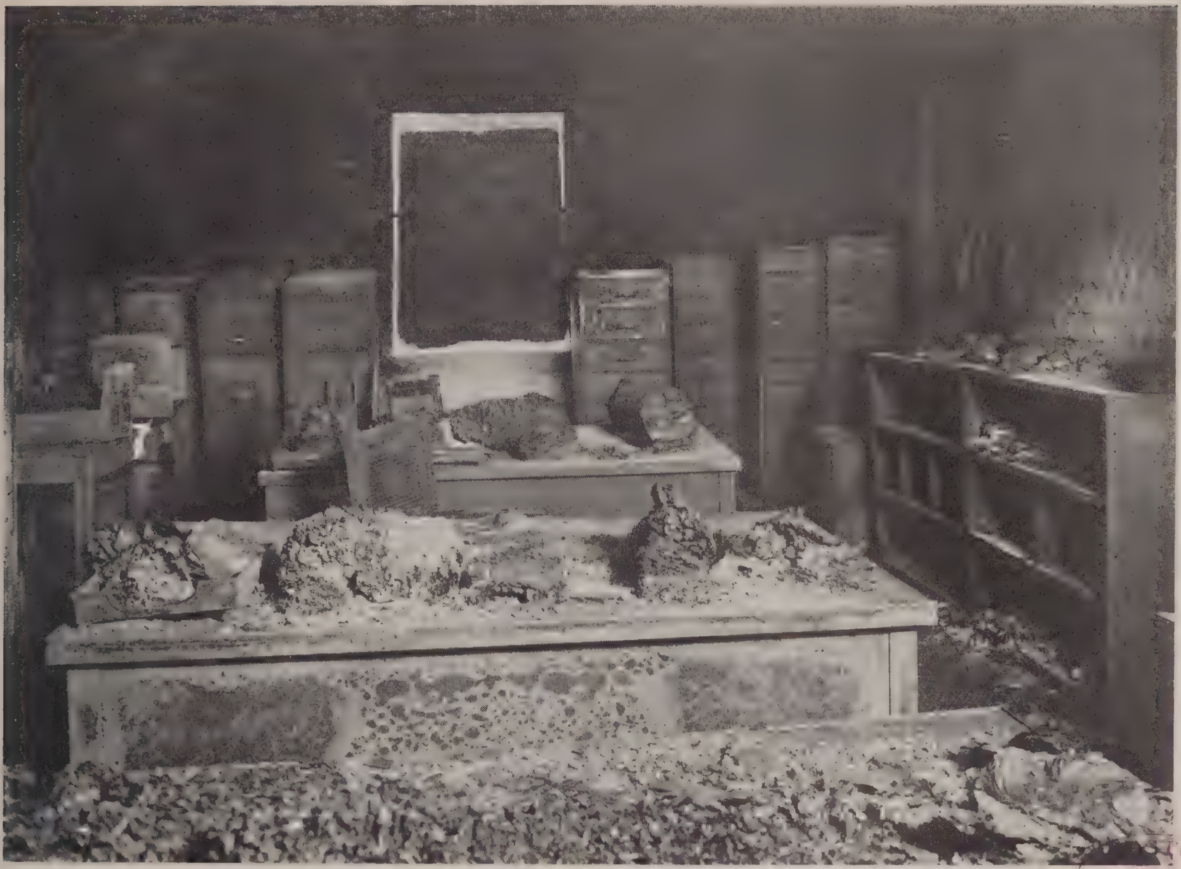

Fig. 6. Metal Furniture on Wood Floor After a Fire With Exposure Start

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condition involving the room contents developed. Temperature maximums from 55 to 808° C. (131 to 1,486° Fahr.) were recorded for different portions of the room, most of the heat developed being from the fuel in the grate. At the end of 30 minutes, the temperature maximums were generally below points causing ignition of combustible materials. The highest equivalent duration obtainable from this test was 9 minutes, which was obtained from the curve for the upper level, 18 inches below the ceiling. After the exposure start with wood finish floor, about the same extent of initial spread of fire occurred as in that with cement finish floor. The fire in the wood floor progressed more rapidly than with the slow start for the fire, being about 20 inches from the opposite end of the room at 4 hours, when the fire was put out. Average room temperatures above the ignition point of paper obtained for most of this period. The equivalent fire durations (Table 1) range from 2 minutes to 48 minutes, depending on the base line and the temperature curve taken.

Record Room Occupancy; Wood Shelving. One test was conducted in the large building with records on wood shelving, the combustible weight being from 44 to 52.2 pounds per square foot assumed to be uniformly distributed. This followed a previous similar test in the small building with records and shelving weighing 55.4 pounds per square foot. The latter was given an exposure start from the grate, the equivalent durations being longer than for any other test. The results for the east section of the large house cannot be considered fully valid on account of the irregularities involved in starting the fire from a single small origin in this section. The wood shelving in these tests collapsed within one hour after the fire was burning freely, precipitating the paper contents in a mass which burned slowly.

Record Room Occupancy; Metal Shelving. The long equivalent durations obtaining for the tests with records on wood shelving prompted inquiry into methods whereby the hazard can be reduced, which led to tests with metal shelving. The results with wood shelving indicated that the building members adjacent to such concentrations would require heavier protection than those for the portions of the building housing the regular office occupancy as such. Inasmuch as these concentrations may occur anywhere within the building, the general design would have to take them into account, if fires completely consuming them without any fire extinguishment are to be premised. The tests with records on metal shelving

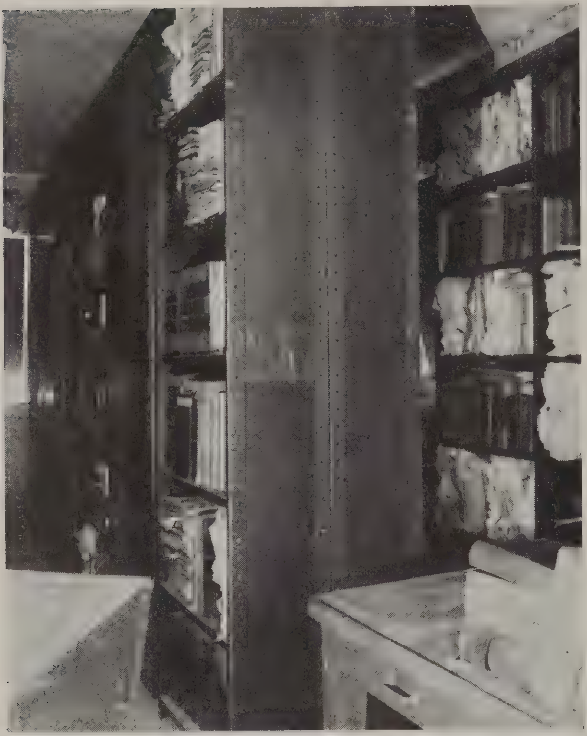

Fig. 7. Metal Shelving, Backed and Partitioned Type, Before Fire Test

were all conducted in the small building, the weight of records, assumed uniformly distributed, being 48.5 pounds per square foot of floor area, which was the same as was present in the previous test in the same building with records on wood shelving. No wood top floor was present in any of the tests with "record room" occupancy. In the first tests, shelving representative of several general types was introduced, nearly one half of the records being on "skeleton" type shelves having no partitions or backs. Others had partitions but no backs, or else backs without partitions, and one single-depth, 29-foot row had both backs and partitions, with doors on two 3-foot-wide sections.

The first of these tests was started with a waste paper basket fire in front of a single-depth bay open at the front, but with metal back and partitions. The window shutters were opened to give the air supply deemed most favorable for fire spread, but no general fire condition resulted, the fire when put out after 7 hours, 20 minutes, being confined to two 3-foot sections with some charred or glowing papers in a cupboard adjacent to one of them. The affected paper was replaced, and two fires were started simultaneously in piles of waste paper placed on the floor,—one in front of shelving similar to that used in the first trial, and the other in front of a double-depth "skeleton" row. The fire progressed more rapidly than in the first test, particularly in the open shelving, and at the end of 1½ hours the whole room was involved. Collapse of skeleton-type shelving began at this time and eventually involved all of the shelving that did not have partitions. All combustible contents of the room were completely consumed, the equivalent duration of the fire being 5 hours, 15 minutes as derived for the 150° C. base and 4 hours, 40 minutes for the 300° C. base.

The room was fitted with new shelving, mainly of the backed and partitioned type with doors every third bay. Three double bays of well braced skeleton type shelving were also included. In one test with a slow start for the fire, made in a manner similar to that of the first test already described, the fire progressed laterally through a 3-foot wide cupboard section and another 3-foot wide section with open front in 20 hours, but no general fire spread resulted. A second fire in front of a double-depth, open-front, backed and partitioned bay, spread through a closed front section on each side and involved the whole 18-foot wide stack in about 9½ hours. In this test the window shutters were kept at the lowest opening, and while this retarded the fire at some stages, it enabled room temperatures to be built up high enough to cause general fire spread at 13½ hours.

The room was reloaded for tests with "exposure" start for the fire, approximated as in the previous tests by starting a fire in oil-soaked wood kindling in the grate in one corner of the room. After withdrawing the surrounding shield when the kindling was burning freely, the resulting air temperatures in most portions of the room were above the ignition point of paper for from 10 to 15 minutes. While fires started at many points, they did not progress, and after 2 hours the average room temperature was below 100° C. Similar results were obtained in a second exposure start. After one hour the window shutters were closed to their lowest opening, and the fires which had started in various portions of the room were allowed to go on until air temperatures high enough to cause general fire spread were built up.

TABLE 2

EQUIVALENT FIRE DURATIONS FOR OFFICE AND RECORD ROOM OCCUPANCIES IN FIRE RESISTIVE BUILDINGS EQUIPPED WITH COMBUSTIBLE FURNITURE AND SHELVING

Total combustible content (Inclusive of finish floors and trim)		Equivalent fire duration	
Lbs. per sq. ft.	Assumed B.t.u. per sq. ft.	Hrs.	Min.
10	80,000	1	00
15	120,000	1	30
20	160,000	2	00
30	240,000	3	00
40	320,000	4	30
50	380,000	6	00
60	432,000	7	30

This required about 4 hours, the fire in the skeleton bays being mainly responsible for the relatively rapid temperature rise. The contents of the whole room were soon involved, the fire being quite intense but of shorter duration than in previous tests with record room occupancy. No collapse of shelving supports from fire exposure occurred during this test, most of the contents remaining on the shelves until consumed (Fig. 8). The equivalent duration of the fire (Table 1) was 5 hours, computed to a base of 150° C., and 3 hours, 41 minutes computed to the 300° C. base.

Temperatures in the Debris. The temperatures and equivalent fire durations so far discussed are based on free air temperatures and do not consider those in the glowing or hot debris on the floors after the fire. Measurements of such temperatures were made at three or more points in the different tests. For office occupancy with wood or metal furniture, these temperatures were indicated to give a more severe exposure than the air temperatures only where extra high cabinets of considerable area were present. Insulated safes, having fire resistance of little above 1 hour as referred to the standard fire test and placed closely adjacent to four-drawer wood filing cabinets in the burning-out tests, satisfactorily preserved their contents. However, the depth of the debris from some of the large stacks of shelves or cupboards 6 feet high, present in the office occupancy test in the large house as well as the temperatures measured in it, indicated a more severe exposure than the air temperatures developed. The depth of the debris and duration of high temperatures were even greater for record room occupancy and wood shelving, average temperatures of 300° C. (572° Fahr.) or over obtaining for periods of up to 16 hours. For the test with records on the skeleton-type shelving that collapsed, the debris temperatures indicated a condition only slightly more severe than the air temperatures, and for the last test with steel shelving that did not collapse, the debris or floor temperatures gave a duration about the same as that for the air temperatures computed for the 150° C. base and very much lower (1 hour, 46 minutes) for the 300° C. base.

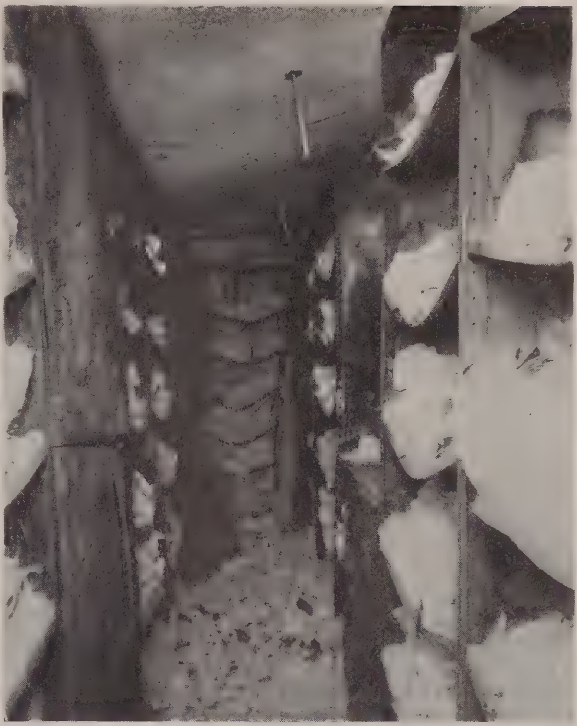

Fig. 8. Metal Shelving, Backed and Partitioned Type, After Fire Test

TABLE 3

EQUIVALENT FIRE DURATIONS FOR OFFICE AND RECORD ROOM OCCUPANCIES IN FIRE RESISTIVE BUILDINGS EQUIPPED WITH INCOMBUSTIBLE FURNITURE AND SHELVING

Occupancy	Furniture	Finish floor	Total combustible content, (Inclusive of any wood floor and trim)		Equivalent fire duration	
			Lbs. per sq. ft.	Assumed B.t.u. per sq. ft.	hrs.	min.
Office	Incombustible filing cabinets, desks, shelves	Incombustible	10	74,000	0	10
Office	Incombustible filing cabinets, desks, shelves	Combustible	12	91,200	0	30
Record room	Incombustible open shelving	Incombustible	50	350,000	5	00
Record room	Incombustible partitioned and backed shelving	Incombustible	50	350,000	4	30

While these temperatures indicate the desirability of not placing safes and similar containers in close proximity to high concentrations of combustible materials, the heat effects from the debris will be mainly on the floor construction. Since as a rule there are no combustible materials or finishes on the ceiling side of floor construction, higher temperatures can be permitted than for walls and partitions protecting combustible materials in contact with the unexposed side. This consideration, together with the fact that water will generally be applied on the debris from such concentrations, apparently justifies the basing of fire-resistance requirements on fire durations derived from measurements of the air temperature of the room rather than from those of the debris.

Summary and Conclusion. The equivalent durations given in Table 2 for assumed amounts of combustible contents are based on the results given in Table 1 for office and record room occupancies employing wood furniture and shelving. The periods given are intermediate between those obtaining for the 150 and the 500° C. base, being possibly a little closer to the former than the latter. The periods for the 30 and the 40 pounds per square foot of combustible content are derived by interpolation between the results with office occupancy on one side and with record room on the other. There is also a little extrapolation involved in connection with the periods for the 10 and the 60 pounds per square foot floor load. The heat of combustion of the contents is taken at 8,000 B.t.u. per pound up to 40 pounds per square foot combustible content, beyond which it is decreased to 7,600 and 7,200 B.t.u. per pound for the 50- and 60-pound floor load, to allow for the relatively greater amount of paper entering into the contents.

To judge by the trend of the experimental data, the one-hour equivalent duration for 10 pounds per square foot combustible content is a little higher than indicated by the tests. The periods for the 15- and 20-pound load are, however, near the average of experimental values. The small margin for the lowest period is considered desirable, since with low room contents the increase in severity from exterior exposure and similar fire effects would be relatively more pronounced than for rooms with a greater amount of combustible contents. The periods as they stand contain an element of exposure of the amount obtainable from the equipment used to produce an exposure for the fire in the tests. The periods given in Table 2 for 50 and 60 pounds per square foot content appear a little low as judged by the weight of contents alone. In the tests with records on wood shelving, the contents were mainly old government account records on grades of paper that had a higher fuel value than can be premised for the paper that generally constitutes the contents of record rooms. Hence in Table 2 a somewhat lower B.t.u. value is assumed for the contents than obtained for the paper in the tests with record rooms, and on the basis of these assumed values, the equivalent durations given will be found to accord with the results of the tests.

The periods for office and record room occupancies with metal furniture and shelving given in Table 3 are obtained directly from Table 1, from the tests with comparable equipment and combustible contents. For office occupancy with cement finish floor, the value in Table 3 is a little above the maximum obtaining at the upper level in the burning-out test with exposure start for the fire. The other periods are chosen to include allowance for exposure start for the fire comparable with what was done in deriving periods in Table 2.

Application to Other Occupancies. The equivalent fire durations summarized in Tables 2 and 3 apply in the main to light commercial, office or record storage occupancies where the combustible materials are principally wood and paper. The extent to which the results of these tests can be applied to other occupancies depends on the character of the combustible materials housed and their calorific values as compared with those for wood and paper. In Table 4 are given the calorific values for most materials or material-forming substances that are housed in buildings. These were compiled mainly from printed matter on the subject. Determinations were made on wood and paper present in the tests and on some fibrous organic materials. In addition to the calorific value, the readiness with which a given material burns would also have to be considered. It is intended to conduct some tests in the near future to obtain information on the effect of such variations on resulting equivalent fire durations. It will be seen from the table that a considerable number of materials have calorific values within the range given for wood and paper. It appears probable that for occupancies housing such materials, and possibly for some that have properites outside of this range but with burning properties not too far different from wood and paper, a fair approximation of the equivalent fire durations to be expected can be obtained by applying the B.t.u. values and corresponding equivalent fire durations given in this paper.

Acknowledgments. The writer acknowledges helpful coöperation in supplying material and equipment for the tests from R. E. LeFevre, Superintendent, General Supply Committee of the Treasury Department, and officers of the Bureau of Supplies and Accounts of the Navy Department. The metal furniture and shelving used in some of the tests were supplied through the courtesy of the National Association of Steel Furniture Manufacturers, J. D. M. Phillips, Secretary. The brick for the larger test structure were donated by the Common Brick Manufacturers' Association of America, Ralph P. Stoddard, Secretary-Manager. Acknowledgment for assistance in the construction of the buildings, the conducting of tests and the reduction of the test data is due to J. F. Angier, C. R. Brown, A. C. Hutton, N. D. Mitchell, L. B. Morris, Gale Murphy, and H. E. Newcomer, members of the Fire Resistance Section of the Bureau of Standards.

THE SUPERVISION OF CONSTRUCTION OPERATIONS

BY

WILFRED W. BEACH

CHAPTER 5, BEGINNING THE WORK—(CONTINUED)

Editor's Note. In the April issue Mr. Beach gave an interesting and instructive account of the architect's superintendent's "First Day on the Job." He also began Chapter 5, entitled, "Beginning the Work," continued here. In this issue of The Architectural Forum, *Mr. Beach also takes up Chapter 6, "Contract Changes," and shows the problems that arise and the part the superintendent must play in their solution. The article in the April issue quoted paragraphs from the specifications regarding storm water and pumping.*

In consideration of the provisions in these clauses, the superintendent suggested that, inasmuch as the general contractor was obligated to continue to keep the excavation free from water after his subcontractor had finished excavating, the general foreman would be justified in getting a power pump and putting it to work, leaving the question as to who would pay for this emergency pumping to be settled next day, when the general contractor would be present to give his views. It was so arranged, and a gasolene-driven pump was at work before the downpour had ceased. The grounds were too wet for other operations, and the foreman intimated that they would be justified in asking for credit for a day's delay, under the clause in the specifications appertaining to such an event. This is "Art. 18. Delays and Extension of Time" of the General Conditions of the American Institute of Architects and provides that "if the Contractor be delayed . . . by any causes beyond the Contractor's control . . . then the time of completion shall be extended for such reasonable time as the Architect may decide." But it further stipulates that "no such extension shall be made for delay occurring more than seven days before claim therefor is made in writing to the Architect."

The superintendent admitted the validity of the claim and cautioned the foreman that it must be made to the architect in writing, but the foreman preferred to leave this formality to the contractor who was expected back the next day. Here the superintendent took occasion to advise the foreman that, in the absence of his employer, the general foreman was supposed to be in charge, and that he should have a more distinct understanding as to the amount of authority vested in him. This is clearly set forth Art. 14 of the General Conditions just quoted. It is most important that a general foreman be made to realize that he is possessed of adequate authority for full conduct of the work at all times when the contractor cannot give it personal attention. If this is not insisted upon and made clear at the start, the superintendent is likely to be frequently rebuffed with the statement that this, that or the other thing must await the decision of the contractor, either by mail or at the time of his next visit,—the while the work goes on, and the issue may be dodged or forgotten.

Under such conditions the superintendent may eventually find himself doing the work of the general foreman,—perhaps with full approval of the contractor, who is thereby saving the additional wage of a more competent foreman, and asserting meanwhile that a better man is not available or that a new man might "ball things up." "The job is going satisfactorily all 'round, isn't it? What more can one want?" "It's dangerous to change horses in the middle of a stream," etc. Such a situation arrives with imperceptible advances and is extremely dangerous. The superintendent is assuming responsibility which may seriously react upon his employer and for which he is not being remunerated.

A case in point is that of a superintendent who had acquired the habit of doing little things for a backward foreman on a residence alteration. Arriving at the house late one morning on his regular round, he saw men standing idle, waiting for flooring, and no foreman in sight. He telephoned the lumber yard and demanded:

"How about that oak flooring for the Smith job?"

"Are you talking for Edwards & Henry?" was the rejoinder.

"For their foreman, yes."

"Well, we're glad to know you're ready for it. First we've heard. Send it right up."

"All right; hop to it. The men are waiting."

"Sure. It'll be there right after lunch."

Now, the superintendent didn't know, or didn't think, about the big Smith apartment house being built under another architect by the same contractors, who called *it* the "Smith job" and the smaller contract, the "J. T. Smith alterations." The unfortunate superintendent had inadvertently ordered all the flooring for a 75-apartment building, a rush job. Truckload after truckload filed out there during the afternoon, before the shipment could be countermanded, only to find the plastering unfinished and no place to unload.

When the sleepy foreman awakened and began to inquire for *his* flooring, the mess was untangled,—at a cost for hauling and handling of $160, which was assessed against J. T. Smith's architect. In vain did the superintendent contend that the same mistake *might* have occurred if the foreman had done his own telephoning. There was no escaping the fact of who had ordered the flooring. Thereafter, one superintendent was much more discreet in the performance of duties other than his own. His telephone demand should have been made to the office of the contractors,—not to the yard.

On Tuesday morning, the architect and contractor were both on hand at the school building, which we are discussing, and the subcontractor at once brought up the question as to who was to pay for the pumping just mentioned. Of course the general contractor insisted that it was included in the excavating, as it should have been according to the specifications,—but he could not swear that the excavator had seen the specifications. Appeal was made to the architect, who called the superintendent aside to discuss particulars, remarking that it appeared that the contractor was "stuck" because he had been careless in letting an oral contract, albeit on a written bid. But the superintendent had discovered that the excavator had a pumping outfit and had expected to use it, hence his contention was in the nature of a bluff, fairly well founded. The architect thereupon advised the contestants that, under the contract, it was distinctly not his business to interfere between a contractor and his "sub" but that, if they cared to leave the matter to the superintendent as an arbitrator, he would permit him to render a decision. After discussion with his foreman, the contractor acceded to this, as did the excavator. The superintendent made his acceptance of the office of arbitrator conditioned upon their further agreement to abide by his decision when rendered, not because it was his function nor that of the architect to act in this capacity, but purely for the sake of amicable procedure. With this assurance, he decreed that, inasmuch as it was essential that the excavation be kept free from water in order that the steam shovel could work efficiently, as well as to enable the general contractor to dig his footing trenches and pour his concrete, and that this contingency was fully covered in the specifications (by which, if it came to a showdown, the subcontractor must be bound or vacate the premises), and whereas both contractor and subcontractor were equally remiss in the failure of the latter to read that portion of the specifications in which he was particularly interested, it therefore appeared most fair that, so long as the subcontractor and his men remained in the excavation, he and the general contractor should share equally in the expense of keeping the water out. Everybody appeared satisfied, including two members of the board who had appeared during the discussion.

The general foreman then raised the question of a time allowance for loss of the preceding day, of which the contractor made note and said a letter would be sent the architect on the subject from the contractor's office next day. This caused a suggestion from the superintendent to the effect that there should be specific understanding all around that the foreman possessed the necessary authority to handle all matters demanding prompt action, in the absence of his employer. In this he was warmly seconded by the architect, who pointed out that this contract plainly called for a foreman competent to have such dependence placed in him, adding that copies of such orders as the foreman might issue or accept should be in his home office next day to be checked up. Such was therefore made the general understanding.

CHAPTER 6

CONTRACT CHANGES

EVERY superintendent of experience has learned to appreciate the joy of seeing a "no-change" building contract carried to completion and, conversely, to dread changes, at least to a degree that will impel him to make use of every safeguard to avoid having trouble and entanglements follow in the wake of such changes. In this, he has the specific mandates of the specifications to support him. (Arts. 15 and 16 of the General Conditions of the American Institute of Architects.)

One of his duties is to see that these provisions are closely adhered to, both by his own home office and by the contractors. One absolute and inviolable rule must be that no departure of any character, no matter how seemingly trivial, from a strict interpretation of the terms of the contract will be permitted, unless covered by a formal change order. This is one of the most important of a superintendent's inhibitions, yet it is one too much abused by men whose experience should have taught them the peril of laxity in this particular. It is easy to say "Yes, it will be just as well to do it that way," or "Stick in a half-dozen extra rods there; we can save them somewhere else," etc. But it is only a short step from such offhand procedure to carelessness in more important matters. The only wise course is to make strict adherence to due formality the positive rule, from which there are to be no exceptions. This applies not only to orders emanating from the architect and superintendent but to the owner's instructions as well. The latter should be prevented, to such extent as can be diplomatically effected, from doing or saying anything to any contractor or employe on a building that may be construed as authority to do something at variance with contract stipulations. Ordinarily, an owner with average intelligence or common business sense can readily see the purpose of this, or will quickly be brought to appreciate it, if explained. Such explanation should not be withheld on the assumption that it is the owner who foots the bills, that he is fully of age, and hence should be permitted to do as he pleases with his own. One who does so to the extent of interfering with the proper execution of his contract is likely, later on, to claim in defense that the architect was employed to keep the owner from getting into trouble but did not use adequate measures. Such an owner should be held in restraint, if possible. He may carry his officiousness so far as to ultimately induce an allegation on the part of the contractor (as in a particular example) that the terms of his contract had been set aside *in toto* by reason of several orders from the owner. The admission by the owner of the validity of some of these orders once tended to establish the general contention of the contractor and provided a foundation on which he based a claim to several extras for which the owner had not anticipated any charge whatever.

One is naturally more formal in conducting the details of public work than in private matters; and one will commonly encounter fewer changes in work of a public nature. In operations for an individual client, the owner takes a closer personal interest and insists upon having things to his liking. If it be an alteration job, the number of changes may mount up rapidly, and one must watch every step, or the day of final reckoning may prove anything but a joyous holiday. If a superintendent can face such a day with the record of every extra and deduction "in plain black and white" and duly attested, he has no reason to worry, even if the number of such changes should reach a hundred or more,—as is quite possible.

The superintendent on our school building being considered in these articles had no intention of allowing any loose ends to drag at the beginning of his work and to later develop into sources of misunderstanding and disagreement. He therefore took note at this juncture of the fact that, although the steam shovel was in position to operate on Tuesday morning after the storm, it was not possible for the dump trucks to get around in the mud until later in the day. This was important in connection with the excavator's contention that further delay in decision on depth of the basement would cause him added expense. It was evident that no such claim could be established until all the excavating equipment could work to advantage.

The subject of this proposed change in height of grade at the building was therefore next in order for the attention of the architect when he came on the work Tuesday forenoon. In explanation of this proposed change, the reader is referred to the plot plan in Fig. 8. Datum was established at +100′ (marked "O" on the plot plan) and several other bench marks were permanently shown by incised crosses on the curb, so separated that an instrument could pick up at least one from any position. The bench mark on the curb at the head of Ash Street, opposite the center of the building on the north, was +117.00′. Natural grade around the building is shown by the plot plan to vary from +117.05′ at the northwest corner to + 111.15′ at the southeast corner. Finished grade at the building had been established at +118.00′ along the north front and at +116.00′ on the south, with short slopes connecting the two levels on the east and west ends; making a fill of nearly 5 feet at the southeast corner, tapering up to grade toward the north and west. To raise the grade 3 feet, as was proposed by the town planning commission, would have improved the commanding appearance of the north facade, as viewed from Ash Street, but the architect questioned the probable benefit as viewed from Orchard Street or other points to the south, as the building was already sufficiently high for that prospect, in his estimation. He did see a possible advantage to be gained by increasing the height of the basement windows, in case the grade on the south were left 4 feet lower than the north, in place of the 2-foot difference shown by the drawings. The west wing of the basement was given over to toilet and bath rooms, including a swimming pool, the center section to laboratories and rooms for the school dentist and nurse, while the east wing was devoted to the heating plant and storage. There were no windows provided on the north side of the basement, as the main floor was only 1 foot, 9 inches (three steps) above grade.

Apparently, the only serious objection to the change was that the bearing capacity of the underlying soil would probably not be so good at the higher level. This would have to be investigated, —possibly tests made. The area of the building was 21,050 square feet, and the area to be excavated (2 feet larger all around than the outside dimensions of the basement walls) was 23,006 square feet. The entire excavation totaled 11,438 cubic yards. Each foot of rise of the building would save 852 cubic yards of excavating, or 2,556 cubic yards if the building were raised 3 feet. It developed, in the course of conversation with board members who were visiting the site, that one of the local unsuccessful bidders had said that the district could save over $1,000 for every foot the building was elevated, and hence the board was counting on a saving of at least $3,000 by making the change. The architect took the subject under advisement and promised to have a report ready for decision at the called meeting of the board that afternoon.

In discussion with the general contractor and his subcontractor for excavating, the architect learned that the contract price for this branch of the work was $7,400, or about 65 cents per cubic yard, and hence the saving for the 3 feet of excavating could not apparently exceed $1,660.40. But even this amount of saving was denied by the "sub," who divulged the fact that he was getting $1 a yard for the earth he had contracted to haul to a certain low lot; that he expected to use all his surplus in this manner, and that it netted him a profit of about 37½ cents a yard, which he stood to lose if the 2,556 yards were taken away from him. He said his competitors were sore at him because they had fixed $1.15 a yard as the price to be used on the school job, and that they were undoubtedly back of the attempt to reduce the amount of his work and cut his profits accordingly. The deduction of 2,556 cubic yards would take away almost one-fourth of his work, and he felt that he was entitled to the profits he had anticipated, regardless of the amount of material eventually moved, especially as he had been the means of saving the district considerable money.

It is thus evident that contract changes may be much more involved than merely the deduction or addition of so many units at a known cost price, plus overhead. In many trades, they are not so readily computed. In this case there were several factors to be considered, and it was also evident to the architect that local jealousies were beginning to appear and would have to be reckoned with. He had learned that the board member who was on the town planning commission was a brother-in-law of an architect, one of the losing competitors for this particular work, and hence this board member could be expected to introduce embarrassing issues whenever opportunity offered. In order to be sure of his ground in this case, the architect secured a sworn copy of the grading contractor's bid and was also able to get a copy of a bid by another grader which ran nearly twice as high. He then carefully computed the various quantities of excavating and fill and paid a visit to the lot to be filled and to its owner. The latter confirmed the price to be paid for the earth. He could not use more than 1,200 yards, whereas the contractor had to take out about 5,500 yards more than he could use on the premises. He would therefore still have about 1,800 yards to dispose of, if he were to submit to a deduction of 2,556 yards. It appeared doubtful if he would find any better place to dump it than on the lots south of the school property, where he could get nothing for it. The whole question thus resolved itself into these elements:—

1. To what extent were the contractor and his "sub" entitled to unearned or anticipated profits on such items as this when a deduction from the contract price was made?

2. What could be assumed to be the true anticipated profit of the subcontractor on the material he had hoped to sell?

3. If he were deprived of his sale price of $1 per yard on 2,556 cubic yards, what would that make the remainder of his excavating cost him per yard?

Answering the first of these, it is customary, in making deductions from a contract price (unless the items are *very* large), to deduct the computed net cost to the contractor without reducing his gross profits on the entire work, since those profits represent his interest in the whole transaction, the which is not lessened by the lopping off of minor items. Carried to a logical conclusion, this would appear to be true in the case of a subcontractor. The answers to the second and third queries were purely matters of conjecture. No definite evidence could be adduced as to the exact cost of the work per yard, since the contract included subsequent backfill and grading; but, for his own information, the architect set up some actual and some empirical figures:—

6,000 yds. to be taken out and graded, @ 90¢	$5,400
5,438 yds. to be taken out and removed, @ $1.25	6,798
Total	$12,198
To be derived from sale of 5,438 yds., @ $1	5,438
Net cost of excavating and grading	6,760
Subcontractor's profit	676
Contract price	$7,436

If it were costing 90 cents a yard to take the material out and re-handle it, it was probably costing about 60 cents net for the general excavating, and would cost about 15 cents additional per yard to haul it across the road to the south.

Thus was derived a figure of 75 cents per yard, which the architect fixed upon as his unit of cost. Not so the excavating contractor. He and the contractor attended the meeting, and the former let it be known whence, in his opinion, had come the idea of the change, and he added that he did not propose to allow disgruntled competitors to interfere with the profits on work he had beaten them out of. He insisted that he would lose 37½ cents profit on each yard of filling material of which he was deprived, and therefore could allow only a deduction of what would remain after these anticipated profits had been deducted from his cost per cubic yard, which he was willing to assume at 75 cents a yard, as the architect had reckoned it. The general contractor said he would allow a deduction of whatever his "sub" would consent to, but that he could not allow any of his own profit to be forfeited in the change. Here there entered the school principal, who did not intend to keep in the background in such matters, and who had also been doing some figuring. He estimated the saving to be 2,340 cubic yards at $1.15 a yard or $2,691, to which he had added the contractor's profit, making $2,960, as his idea of what should be credited to the owner.

The excavator's figure was $958.50 for the 2,556 yards, but he demanded, also, that he be allowed $100 for the delay he had been caused by not being allowed to proceed at once to the contract depth. This the architect vetoed promptly, both because there had been no delay up to that time, except as due to the storm, and because if there had been a delay to the extent of resultant damage, it would accrue only by going to the lower depth, not if the building were kept up the 3 feet. He also explained the discrepancy in the estimate of the principal, which was evidently due to his having used the net area of the building instead of the gross area to be excavated. The architect further dwelt upon the saving that had been made for the district by virtue of the excavator's having taken the work at a price so much under the $1.15 unit, which could not therefore be used in these computations, nor did he see reason for the contractor's assumption that he should be reimbursed for a conjectured possible profit, of which he had no definite evidence. The architect declared it to be the policy of his office, that, after a contract was signed, the profit to the contractor was thereby fixed for the given work, not to be disturbed by later deductions. He saw no reason why this policy should not be extended to the benefit of the subcontractor in this instance, but insisted that it applied to actual net profits and not to hypothetical earnings. He estimated the net cost of taking out the material and disposing of it at the least expense to be 75 cents per cubic yard, and hence was prepared to issue the order for the change, of which he approved, at that rate, or a total deduction of $1,917. The members of the board saw plainly that the principal's estimate was at fault, and the contractor was able to convince his "sub" that he had best accept the architect's figure.

The change in grade was from +118.00′ to +121.00′ on the north and from +116.00′ to + 117.00′ on the south. This left 2 feet of additional wall exposed on the south and parts of the two ends, which called for about 5,000 extra face brick. The architect took advantage of the change to add 12 inches to the height of the glass in both the upper and lower sash of the basement windows. For these latter changes, the architect and general contractor had readily agreed upon an extra cost of $467, leaving a net deduction of $1,450 for the change. This the architect supplemented by warning the board that, as yet, there could be no definite assurance that the footings as designed would be adequate at the new level. This could not be established until the bottoms of the trenches could be inspected, perhaps tested for bearing capacity.

The board next took up for reconsideration the subject of restoring the tile partitions throughout the building and eliminating the wood lath that were to have been substituted under the contract.

The architect next presented the bond of the general contractor and those of the electric and heating contractors for acceptance, and inquired if the board had received one from the plumbing contractor, a local man. The latter was present and asked that the board approve a personal bond, a copy of which he submitted, naming two prominent men as his sureties. He offered to deduct $400 if the personal bond were accepted. The bond was passed over to the board's attorney, who said the form was "O.K." and handed it back with a question as to how much the other form would have cost, insisting that, if the personal bond were accepted, the district should receive full credit for the difference in cost of the two forms. The contractor admitted that a surety bond would cost 1½ per cent of his contract price (which was $54,000) or $810, the which he grudgingly agreed to allow and which the board unanimously voted to accept. The members appeared to have quite forgotten the advice of the superintendent anent personal bonds, hence neither he nor the architect joined in the discussion, though the latter had a report from the superintendent to the effect that the plumber's reputation in the community was none too good, the which had been confirmed by an adverse report from a plumbing supply house. The reason for the architect's reticence (which greatly surprised his superintendent) was that the next bid was $7,200 higher and was that of a concern in the architect's home town, toward which he was known to be friendly. He noted that this local man had at least two sponsors on the board, one of whom was the lumber dealer. It was later learned that the latter held the plumber's note for $1,200, which the latter had promised to liquidate out of his first payment,—and did. It was a good time for the architect to wait until spoken to, considering the insinuation already voiced to the effect that he welcomed opportunities for increasing his fee through enlarged building costs.

The architect produced the change orders and presented them for signatures, he having anticipated the board's action on both matters. The first of these read:

CHANGE ORDER NO. 1.
CONSOLIDATED DISTRICT SCHOOL
EAST MILLVILLE, P.M.

Millville, P.M., Apr. 24, 1928

Mr. J. Q. Brown, Contractor,
Millville, P.M.

Dear Sir:—Referring to your contract of April 2, 1928, for the general construction of the East Millville Consolidated District School Building, you are hereby authorized to raise the established grade along the north front of the building from + 118′0″, *as shown on drawing, to* + 121′0″, *without increasing the cubic contents of building or walls. The grade along the south side will be raised from* + 116′0″ *to* + 117′0″, *thus increasing the exposed area of basement walls on south elevation and on portions of east and west elevations 2 vertical feet. The glass area and brick facings on these elevations will be correspondingly increased.*

For the saving in excavating due to the foregoing change, there will be deducted from your contract price the sum of nineteen hundred seventeen and 00/100 *dollars* ($1,917); *and for the additional expense due to changes in basement windows and brick facing, you will be allowed the extra sum of four hundred sixty-seven and* 00/100 *dollars* ($467); *leaving the net sum of fourteen hundred fifty and* 00/100 *dollars* ($1,450) *to be deducted from your contract price on account of the foregoing changes.*

Signed, John Smith Jones, Architect
Approved, Consolidated School, District of East Millville, P.M., Owner
By A. B. Hendricks, President
J. U. Petty, Clerk
Approved, J. Q. Brown, Contractor

Deduction,	$1,917
Extra,	467
Net Deduction,	$1,450

The foregoing account of these first job changes is related in detail, chiefly to impress upon the reader the importance of due formality and meticulous care in the conduct of all business transactions and the keeping of all records.* Nor can one be too diplomatic in observing due respect for the personal interests of the owner's representatives, whether these interests be proper or the reverse. In this case, the unbiased members of the board were well satisfied, and the lumber dealer was mollified for the loss of the sale of his wood lath by the assurance that the plumber would now be able to meet his note. The school principal was somewhat out of countenance, but no one appeared to censure him, and hence he was willing to bide his time, for he was beginning to harbor the idea that it would "be a feather in his cap" if he could catch the self-reliant superintendent in a serious mistake.

This series of articles by Mr. Beach, entitled "The Supervision of Construction Operations," began in the January, 1929, issue of The Architectural Forum *and continued in order in the February and April issues. In the July issue Mr. Beach will take up Chapter 7, "Foundations and Masonry Materials." The June issue is a Reference Number devoted exclusively to shops and stores, and consequently will not contain an article of this series.—The Editor.*

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* Exhibit 22 on page 73 of the Handbook of Architectural Practice of The American Institute of Architects offers a proper standard form for contract changes. It contains no intimation, however, that such orders should be approved by the contractor. Such approval is of value, both as a means of forcing immediate settlement of any possible dispute regarding the terms of the order, and also as affording indisputable evidence on the subject later, in case the contractor should claim non-delivery or loss of the order or ignorance of its terms.

7.a

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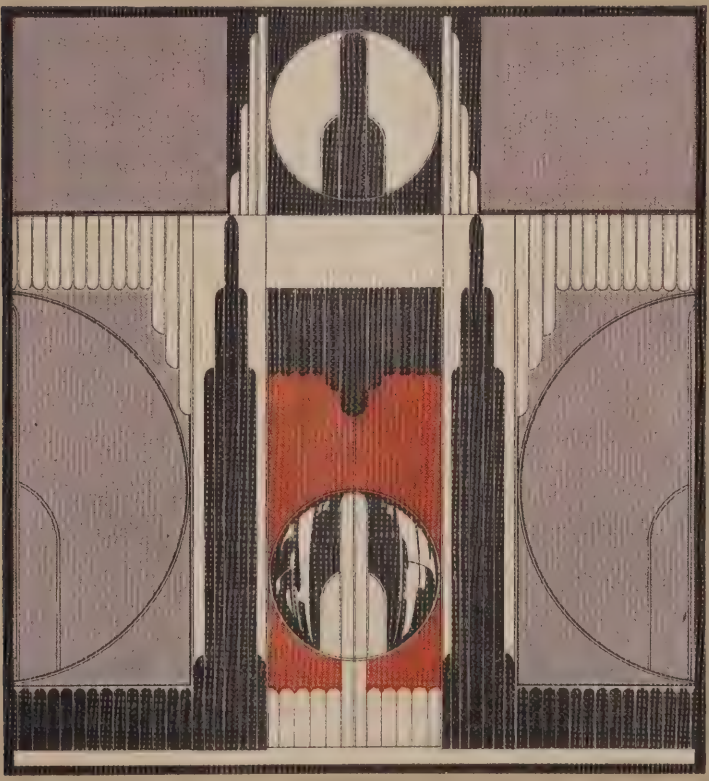

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BOOK DEPARTMENT

DOMESTIC ARCHITECTURE OF PROVINCIAL FRANCE

A REVIEW BY

WALTER F. WHEELER

THERE are several reasons why the architectural type which at present is known as "Provincial French" should find wide favor in America. First of all, the type possesses in an abundant degree that balance, dignity, or slight formality which is to be noted in the best of American country and suburban architecture, and this without in any way assuming a "grand" manner. In the next place, it makes use of almost precisely the materials which are most readily had in the United States; and in addition to these two excellent reasons there are to be noted the facts that climatic conditions in France,—taking France as a whole,—are similar to what prevail (by and large) in America, and that life as it is lived in this country is not unlike what obtains in France at the present time.

No one could have visited and have examined, even superficially, the recent Exposition of Architecture and the Allied Arts in New York without realizing that American domestic architecture has entered upon a new phase or expression. One looked in vain for the historic "front porch," and one notes that American domestic buildings are no longer being designed with regard to but one facade,—that which faces the road or the street,—with no care, or almost none, given to the appearance of the remaining facades. Instead, the house is likely to present to the world, as it passes by, a restrained and well bred reticence, while elsewhere, perhaps fronting a garden or overlooking a lawn, is a terrace, a veranda or much the same thing called by some other name, where the occupants of the house may enjoy the splendor of the garden or the expanse of lawn without being on exhibition to the world and his wife. Then again, the lawn or the garden, and particularly the driveway and the service entrance, are likely to be judiciously screened by walls, shrubbery or fences made of woven saplings, and this too with considerable regard paid to the architectural possibilities presented. And almost more important than all, structures of a subsidiary nature,—garages and the like,—are no longer scattered over the estate's area. Even upon a small plot such buildings are likely to be combined with the main structure, increasing its dignity and often making possible by enlarged size just that degree of formality which present-day taste requires. This naturally brings with it unity of effect.

An Outbuilding, Chateau of Azay-le-Rideau

Now all of this is precisely what the French have always insisted upon. As one tours the rural districts of France one passes countless old farmsteads, *manoirs,* or even small chateaux, often, alas, in ruins or in an advanced stage of decay, but all possessed of the charming qualities which would find favor in America, and which, since American architects have seen and appreciated them, are finding a large and important following among American home owners.

This excellent work upon the architecture of provincial France deals with exactly this. Its authors in their travels through France have selected the examples of architecture which their familiarity with American conditions and American clients has taught them would be most helpful in stimulating appreciation of what is good in architecture and that improvement in taste which is one of the most encouraging signs of the times. America has not been altogether fortunate in its following of French architecture. With the exception of certain old buildings in Louisiana and other parts of the country settled by the French, there is little in the way of French architectural style which has been or is likely to be helpful. When one thinks of French architecture at all, one is likely to think of certain elaborate and costly houses in New York or Newport, or else, where interiors are concerned, of magnificent ballrooms. One never thinks of the buildings of different kinds,—simple, restrained, refined and beautiful,—with which the smaller cities and towns, and particularly country districts of France are filled.

The volume in question consists largely of illustrations, chiefly illustrations of residence structures. A few excellent interiors are shown, but only a few, per-

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haps because French interiors, like all others, lack something of interest without their furnishings, and rural France is being stripped of its furniture and household possessions by the ubiquitous dealers in antiques who gather such objects for export to America. But enough is included to be of immense help to the architect or home owner who would work in this beautiful and wholly charming style. Three of the best examples illustrated in this volume are the Ferme de la Haie, Chateau d'Odre and Chateau de la Pree. The Chateau d'Odre is an immense house, built of small stones and surmounted by a graceful mansard roof. The hardness of the stonework and the plainness of the building, three stories high in places, four in others, are softened by moss and vines, an occasional *espalier,* and the small garden houses attached to each side of the main structure. Below one end is a long pool with water plants growing in it. The farm group is also very large and is close to one end of the house. Near to England, on the Channel, the Ferme de la Haie is one of the best all-brick houses,—only the surrounds of the openings are of stone,—that one has ever seen reproduced. It would seem to be a very early house, hardly out of the "fortified" period. The brickwork is superb, and the spacing of the windows is a delight to the eye. Bare as it is, it needs no gimcrack ornament or whatnots to decorate it. The Chateau de la Pree takes one to high ground in central France. It seems very small until the "spread" of the buildings is appreciated. Like all these houses, it probably has no "circulation" at all. This little manor house, however, has a most engaging appearance.

The Chateau de Charreconduit is a curious example showing use, among other things, of three repeated Classic porches, more English than French in character. In France regions usually govern types, more so than in England, where periods and classes fix the types much more rigidly. The Diane de Poitiers house at Orleans, also illustrated in this volume, seems a little out of place. It is too monumental, too elaborate to suggest a manor house of even the most gentleman-farmer type. As a specimen of a beautiful illustration, that on page 285, of Fleurville, is unrivaled. The three magnolia trees in full bloom, shading the curved steps, are delightful. The portion of the text dealing with gardens, vegetable gardens, flower borders, *potagers* and manor house groups, is particularly satisfactory, and is full of suggestions.

FRENCH PROVINCIAL ARCHITECTURE. By Philip Lippincott Goodwin and Henry Oothout Milliken. Text and plates 11 x 15 ins. Price, $18 Net. Charles Scribner's Sons, 597 Fifth Avenue, New York.

MOULDINGS OF THE WREN AND GEORGIAN PERIODS. By Tunstall Small and Christopher Woodbridge. Portfolio of 20 separate plates. 10 x 12½ ins. Price $3.75. William Helburn, Inc., 15 East 55th Street, New York.

THE rare excellence which characterized the interiors of the Georgian era and of what is sometimes called the "Wren period" was largely due to study by architects of style and proportion and of the application of both proportion and style to the work in hand. Based as it was chiefly upon work produced in Italy,—generally of stone or of some one of what are known as "plastic" substances,—the English architects found themselves confronted with the use of wood, composition, or some other substitute for what would have been used in Italy, and with their taste and skill they recognized the necessity of adapting the scale used to the nature of the material to be employed. Modern architects find themselves facing much the same conditions, and if they are sufficiently careful and discriminating they soon learn to select from a variety of designs just that best suited to the work in question at the time.

This helpful portfolio covers precisely this. Its compilers have selected from the great number of existing buildings of these periods the unenriched mouldings which their architects used for different purposes. The 20 plates illustrate at their full sizes mouldings used for skirtings; dado and panel outlines; architraves; fireplace surrounds and handrails; stair nosings, cornices, and exterior window architraves and sash bars. These details have been secured from many buildings, such as Hampton Court, Clifford's Inn, Denham Place and other structures which are famous as representative of the best of their respective periods. The text says: "After many years spent in gathering a fully representative collection, the chief problem with which we were faced was that of devising a system of reference which should indicate the relation of one moulding to another. This difficulty was eventually overcome by the introduction of an index containing notes on each moulding, which in nearly every case includes references to the plates in the portfolio in which drawings of other related mouldings may be found. It is therefore possible by means of this index to ascertain not only the exact position of a particular moulding in its original environment, but also the manner in which the other mouldings are correlated to it. In some cases it is difficult to differentiate between mouldings used in Wren and in Georgian work, as there are some contours which are common to both periods. It may safely be said, however, that although the general contour is often the same, very few mouldings from different buildings are absolutely identical, as a close examination will nearly always reveal slight differences in proportion and line. So there are therefore a number of references in the index to 'similar' mouldings.

INTRODUCTORY HANDBOOK TO THE STYLES OF ENGLISH ARCHITECTURE. By Arthur Stratton. Part I. The Middle Ages. 32 pp., 5½ x 8¼ ins. Price $1. J. B. Lippincott Company, Washington Square, Philadelphia.

WRITERS on architecture and subjects related thereto have often called attention to the fact that in scarcely any other country of Europe can the continuity or progress of style be studied quite so well as in England. This may be due partly to the fact that the wealth of England has for centuries permitted a full flowering of the desire of the English for architectural excellence, and partly because, owing largely to its geographical isolation, England has escaped most of the warfare which has destroyed so much of value in other countries. The British Isles have not been invaded since the time of William the Conqueror, and such wars as have been waged have not been unduly destructive of English architecture, either ecclesiastical or domestic.

This wealth of structural splendor has been the subject of endless writing. The particular work concerned here does not pretend to deal exhaustively with a subject so large, but is rather a synopsis, an epitome, or a brief

"School Building Programs in American Cities"

By

N. L. ENGELHARDT

Professor of Education, Teachers' College
Columbia University

THIS volume is the most comprehensive and thoroughgoing treatise on the planning of school building programs which has yet been published. It illustrates clearly, by definite reference to specific cases and places, how school building programs should be developed. It includes the latest technique used in analyzing school building needs. The variety of situations presented makes it possible for a superintendent to adapt the specific methods of study to his own local school conditions. The volume represents a cross-section study of school building conditions in the United States. School building conditions in the east, the north, the south, and west are represented in this volume.

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560 Pages. Contains 97 Tables. 20 Charts, 120 Maps, and 70 Illustrations. Price $5.

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survey,—"A Companion to the Series of Large Scale Comparative Diagrams, Prepared for the Use of Schools, Teachers, Students and Others." The illustrations are admirably chosen to illustrate the development of architecture during the period from Saxon times to the fifteenth century, and the closely written and highly condensed text is calculated to lead the student to broader and deeper study and to extended research.

PLUMBING QUESTIONS AND ANSWERS. By Joseph E. Taggart. 164 pp., 4½ x 7 ins. Price $2. Scientific Book Corporation, 15 East 26th Street, New York.

NO part of a building, whether it be a small suburban residence or a mammoth hotel or office structure, is more vitally important than its plumbing. In fact, it might be urged that since the proper service of several departments of a building depend upon the smooth and orderly functioning of its plumbing, it is fully as important as either foundation or roof. The value of proper plumbing is fully recognized by municipal and other governing bodies and is subject to rigid rules regarding the materials to be used and the manner in which they are to be employed. The plumbing code of New York, for example, is an intricate compilation which has been many times changed, revised, and added to until its interpretation is difficult even to those trained to its observance and fully acquainted with its technicalities. It abounds in ambiguities and other pitfalls.

"This volume is of value to all in any way connected with the plumbing trade, as it presents the fundamentals upon which the entire plumbing installation of the largest city in the world is founded. Originally, this work was compiled in response to many requests for an interpretation of the plumbing code of New York. These rules have been converted into question and answer form, some with sketches to make their meaning clearer. Many years of effort and experiment have gone into the drafting of this code, until today it stands as a model for sanitary rules and regulations.

"The new third edition of 'Plumbing Questions and Answers' has been completely revised, considerably enlarged, and entirely reset. It has been arranged in four sections: first, the questions and answers based on the code of New York; second, tests for anti-siphon traps, installation of water supply and laws governing its use; third, the standpipe-fireline rules; and fourth, an appendix of useful tables, measures and calculations. It contains much useful information that should be known by every master and journeyman plumber and helper, sanitary engineer, plumbing inspector, architect, estimator and draftsman. The book is made up in handy pocket style, convenient for carrying around or for study in spare time." Every year sees the graduation from trade or technical schools of large numbers of young men trained for work in plumbing. The courses of instruction in the schools often leave much to be desired, or else with the great number of students they deal with important matters are sometimes overlooked, which renders this small volume particularly valuable.

"CHURCH BUILDING"—*By Ralph Adams Cram*

(A NEW AND REVISED EDITION)

THE improvement which has accompanied the progress of American architecture during recent years has been no more marked in any department than in that of an ecclesiastical nature. This has been due primarily to the rise of a few architects who by travel and study have acquired much of the point of view from which worked the builders of the beautiful structures which during the fourteenth century and the fifteenth were being built over all of Europe.

These architects have closely studied the churches, chapels, convents and other similar buildings in England, France, Spain and elsewhere, and the result has been a number of American churches of an excellence so marked that they have influenced ecclesiastical architecture in general and have led a distinct advance toward a vastly better standard. This improvement has not been exclusively in the matter of design, for plans of older buildings have been adapted to present-day needs, and old forms have been applied to purposes which are wholly new.

THE appearance of a new and revised edition of a work which is by far the best in its field records this progress. Mr. Cram, being perhaps the leader among the architects who have led this advance, is himself the one individual best qualified to write regarding the betterment of ecclesiastical architecture. The editions of this work of 1900 and 1914, which have for some time been out of print, have now been considerably revised and much entirely new matter has been added, which in view of the change which has come over ecclesiastical building of every nature is both significant and helpful.

Illustrations used in this new edition of "Church Building" show the best of recent work—views of churches and chapels large and small, in town and country, buildings rich in material and design and others plain to the point of severity, with the sole ornament in the use of fine proportions and correct lines. Part of the work deals with the accessories of the churches and their worship.

345 pages, 6 x 9 inches, Price $7.50

THE ARCHITECTURAL FORUM, 521 Fifth Avenue, New York

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THE EDITOR'S FORUM

COLONIAL BUILDINGS FOR A SCHOOL

A RECENT issue of *The New York Times* gave interesting data regarding school buildings to be erected near Philadelphia. To quote *The Times*, "when, on May 1, James W. Good, Secretary of War, and General Summerall, Chief of Staff of the army, drive picks into the ground at Colonial Village, in the suburb of Wayne, near Philadelphia, and adjacent to Valley Forge Memorial Park, they will start the construction of a $1,000,000 educational project that in architecture will be unique among the schools of the United States. The buildings will house the Valley Forge Military Academy.

"Here in one group will be buildings that follow the lines of Independence Hall, of Congress Hall, and old City Hall, which are familiar sights of Independence Square, Philadelphia, and are visited yearly by hundreds of thousands of persons from every state in the union. Also, there will be duplicates of the Betsy Ross house, where the Stars and Stripes were fashioned; of the Chew mansion, near which the Revolutionary battle of Germantown was fought, and of the William Penn house and historic Carpenter's Hall. On September 15 the board of governors and the directors of the Academy will turn the group over to Major Milton G. Baker, the commandant. The directors and governors include prominent financiers and business men of the Philadelphia area. The academy was founded a few years ago in old Devon Inn, on what is known as the 'Main Line,' a series of suburban towns outside Philadelphia, where many of its financial and social leaders have homes. This building was destroyed by fire a year ago, and since then the school has occupied temporary quarters. J. Howard Mecke, Jr., founder of Colonial Village, and himself a member of the boards of the Academy, offered the acreage for the school, provided that it would conform to the architectural restrictions placed upon the village."

INTERNATIONAL CONGRESS OF ARCHITECTS

A MEETING of the American Section of the Permanent Committee of the International Congress of Architects was held March 23, 1929, at the residence of the chairman, Cass Gilbert, 1 East 94th Street, New York. Mr. Gilbert entertained the members of the Committee at dinner preceding the meeting. The members present were: William A. Boring, C. Howard Walker, Warren P. Laird, John Russell Pope, J. Otis Post, J. Monroe Hewlett; and George Oakley Totten, Jr., Secretary.

Whitney Warren, J. E. R. Carpenter, Arthur Brown, of San Francisco, and John A. Holabird, of Chicago, were elected members of the Committee. On motion of Mr. Gilbert, the Secretary was directed to cable a message to J. M. Puopinel, Honorary Secretary General of the Permanent Committee: "American Section of the International Congress of Architects in session tonight begs to offer through you a wreath in token of reverence for the great Marshal of France." An invitation was read from the Hungarian Society of Architects inviting all American architects to the International Congress of Architects to be held in Budapest, September, 1930.

AWARDING OF MEDALS

THE Fine Arts Medal of the American Institute of Architects for 1929 was awarded to Diego Rivera, painter, of Mexico. Rivera is internationally known for his murals, which are said to indicate his social philosophy. They describe an alliance of farm and industrial workers in a democratic state. The murals in the education buildings of Mexico are the work of Rivera. They were done under Vasconcelos, Obregon's minister of education. It is the Indian who is set forth as the Mexican in these murals. The industries of the Indian from colonial to modern times are portrayed, as well as the progress of the sciences and the inner life of the Mexicans, accompanying which are portraits of a group of martyrs. Rivera studied for 14 years in Rome, Paris, and other European capitals. On his return to Mexico, he set out to revitalize Mexican art. He organized a union of painters and sculptors as a school which should interpret the life of the people, and which should exemplify the new nationalism of Mexico. The Craftsmanship Medal, also awarded annually by the Institute, this year was given to Cheney Brothers of South Manchester, Conn.

THE 1929 "VAGABOND TOUR"

IN view of the success of the tour for 1928, those in charge are organizing the "Vagabond Tour" for 1929, scheduled to sail on June 26, for two months' travel in Europe. Starting from Plymouth, there will be one week's touring through rural England,—Exeter, the Cotswolds, Oxfordshire,—then crossing to Paris, where there will be begun another tour through the Loire valley and Burgundy, visiting Rouen. Another part of the tour will be across Switzerland to the Italian cities and towns as far as Rome, then to Vienna and back to Paris by way of the Riviera, including a stop at Arles and a motor drive in Provence. The party will arrive in New York on August 31. The tour is in charge of Donald B. Kirby, who conducted the tour of last year. Details regarding the tour for 1929 may be obtained from him at 180 Fifth Avenue, New York, or from the Bureau of University Travel, at Newton, Mass.

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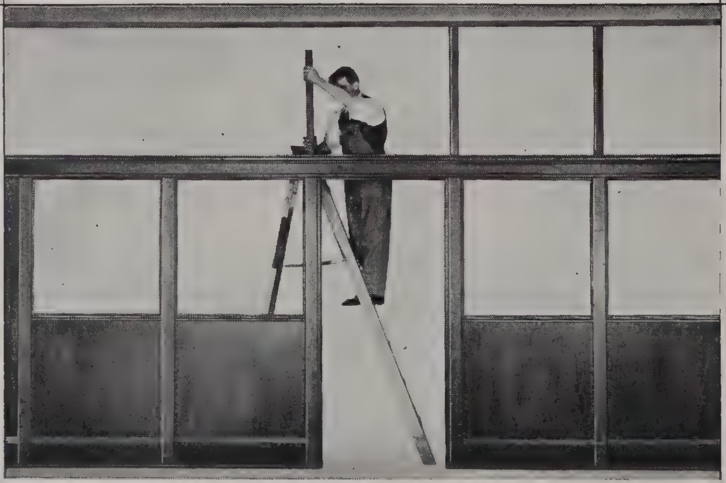

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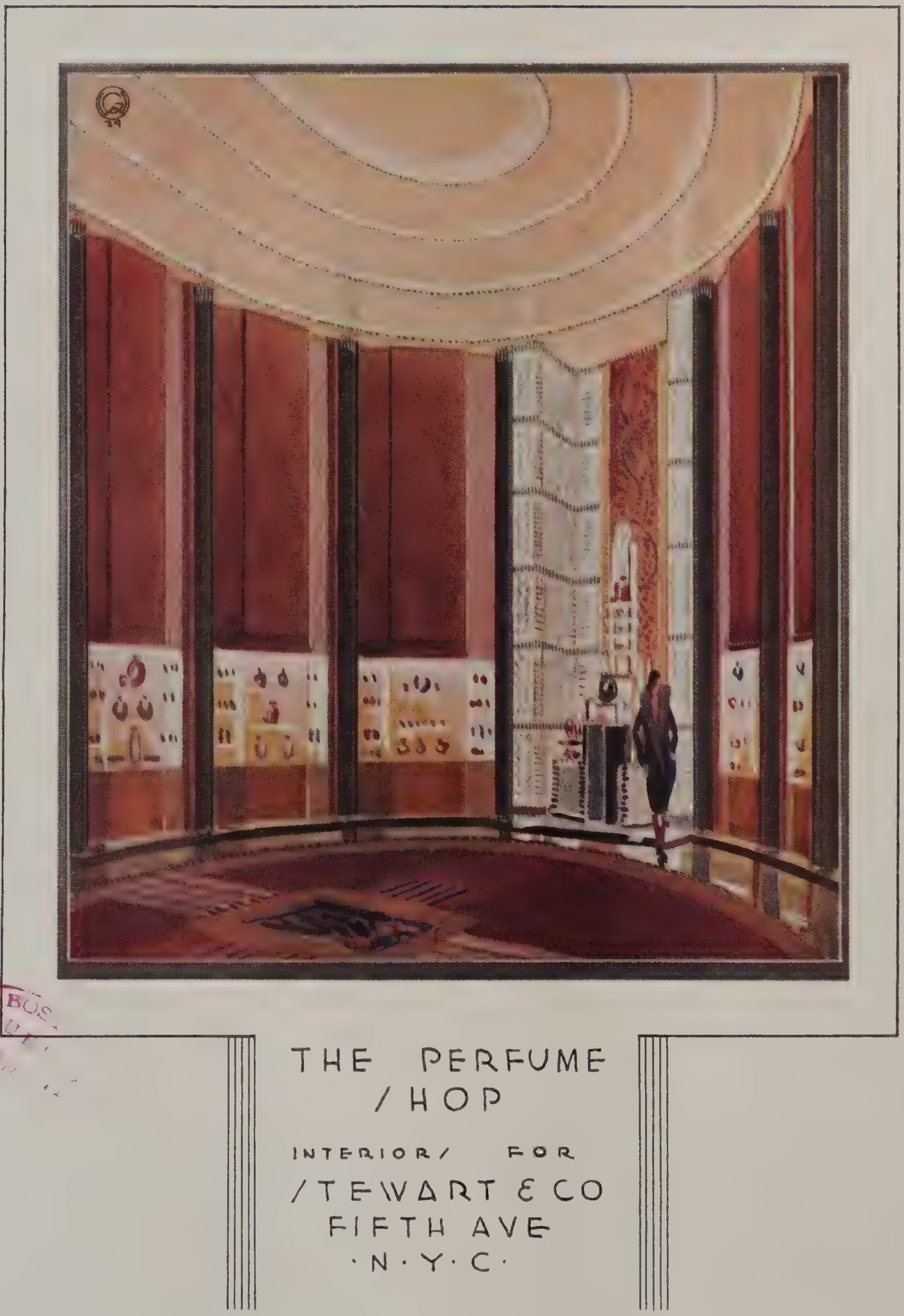

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THE
ARCHITECTURAL
FORUM

VOLUME L

NUMBER SIX

JUNE 1929

THE MODERN EUROPEAN SHOP AND STORE

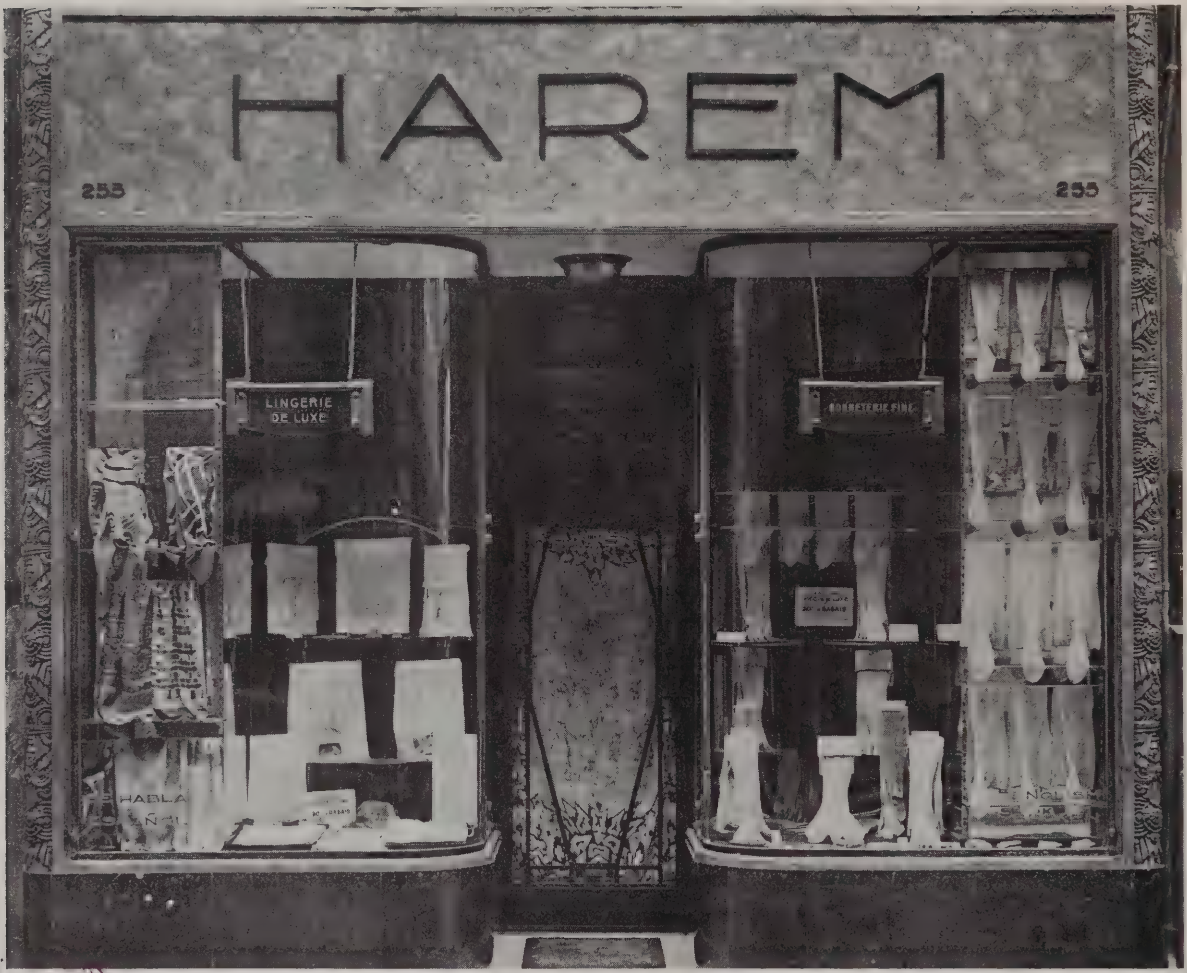
BY

ELY JACQUES KAHN

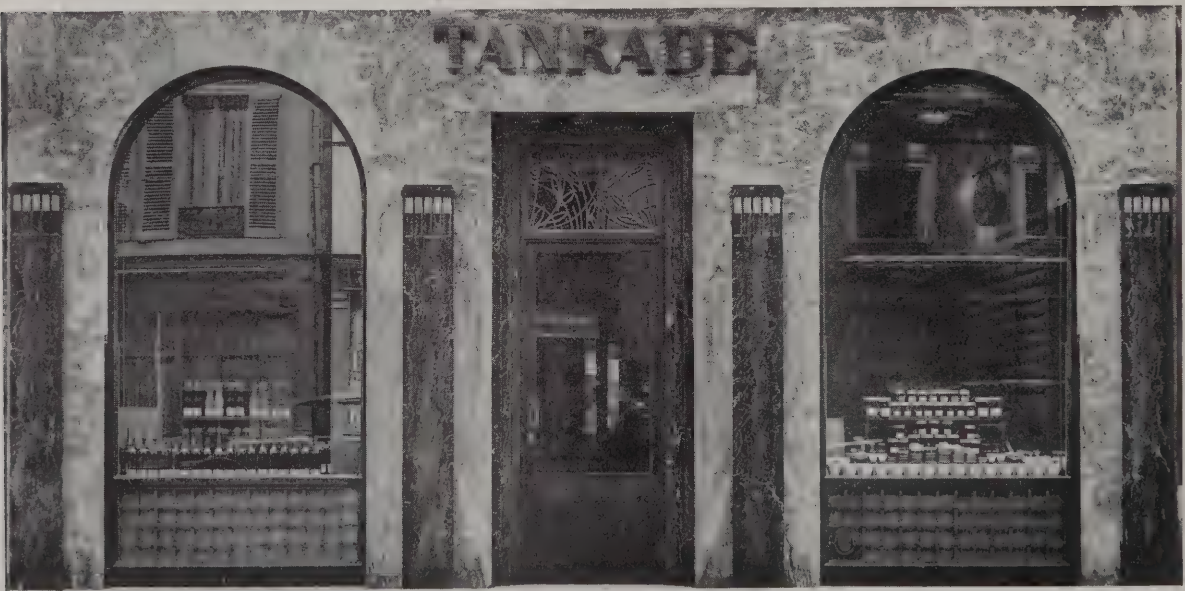
THE rapid development of commerce in American cities has quite naturally brought into existence an astonishing variety and number of stores and shop buildings. So great has been this growth, in relation to contemporary European development, that it would be reasonable to assume that the artistic result might, by reason of its volume, be comparable to European work of a similar character. To attempt to set standards or to make sharp contrasts, however, is not only a difficult but an unpleasant task, and in this instance, with a movement still in full progress, the most that can be recorded is one man's opinion of a momentary situation. It is with due regard to these facts that the subject is approached.

American design in architecture maintains the last bulwark of classicism, if by that term one can refer to veneration of historic form rather than profound knowledge of classic reasoning. What the clear mind of a Greek of the Periclean period might do, were it possible to present the modern problem to his attention, is interesting to consider. It is reasonable to assume that he would not exert himself to adapt the architecture of Rameses or the faded glories of Babylon. Much American energy is directed toward reproducing anything architectural that possesses an ancestor,—whether it be Colonial, Romanesque, Greek, or what one will. The enthusiasm of the architect in discovering the existence of evidences of past performances of note is worthy, and much of the painstaking study and careful execution is admirable. How much of this mass of work actually indicates a sense of design or fitness, looking beyond the acquired technique as more or less mechanical, is another matter. The store, quite naturally, evidences the same history. We have had English "shoppes,"—fake half-timber,—on Fifth Avenue; Italian palaces,—anything that admitted of a reasonable amount of rather indifferently executed decoration. Coincidentally, the mechanics of the store building were being developed. Maintaining the pace and intelligence of American industrial development, elevators, ventilation, shipping appurtenances, floors, fire control, details for the comfort and protection of the customers were studied, specified and installed with little resistance. The shell itself,—the physical block,—varied little except that the large stores increased in size and the smaller stores, primarily, in luxury of equipment. The fault may be that of the architect, or it may possibly be due to the persistence of a myopic client, but, by and large, in proportion to the amount of work accomplished, it is difficult to refer with enthusiasm to many designs that stand close scrutiny.

Europe, quite naturally, had, and still has, its volume of mediocrity,—and worse. Since 1900 the influence of the modernistic movement has been paramount, and together with the shock of a devastating war period and the lack of capital, the designers have struggled against obvious antagonism to a point where practically all of Europe is accepting the fact that something new has now to be acknowledged. The designers have realized that the work of the highly elaborate periods of the seventeenth and eighteenth centuries was done when labor was cheap and materials relatively inexpensive. The money available was in the hands of a few, and they could spend in a lordly and magnificent manner. The modern designer has to deal with a practical problem of material, probably quite different from what his ancestors faced; see the varied marbles, cast stone, carved glass, and various metals of modern Paris. What is important is that the public, as well as the designers, is aware of the situation. Public interest in the latest design is



HAREM, RUE ST. HONORE, PARIS
RENE PROU, ARCHITECT



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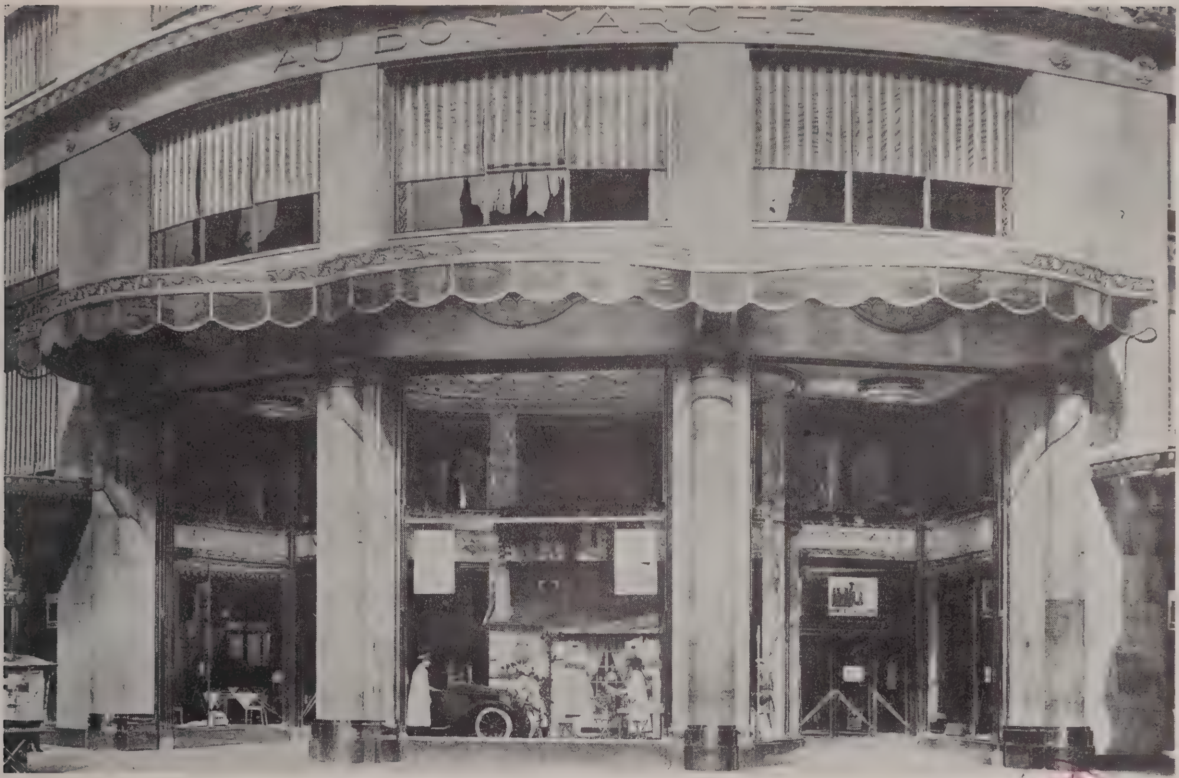
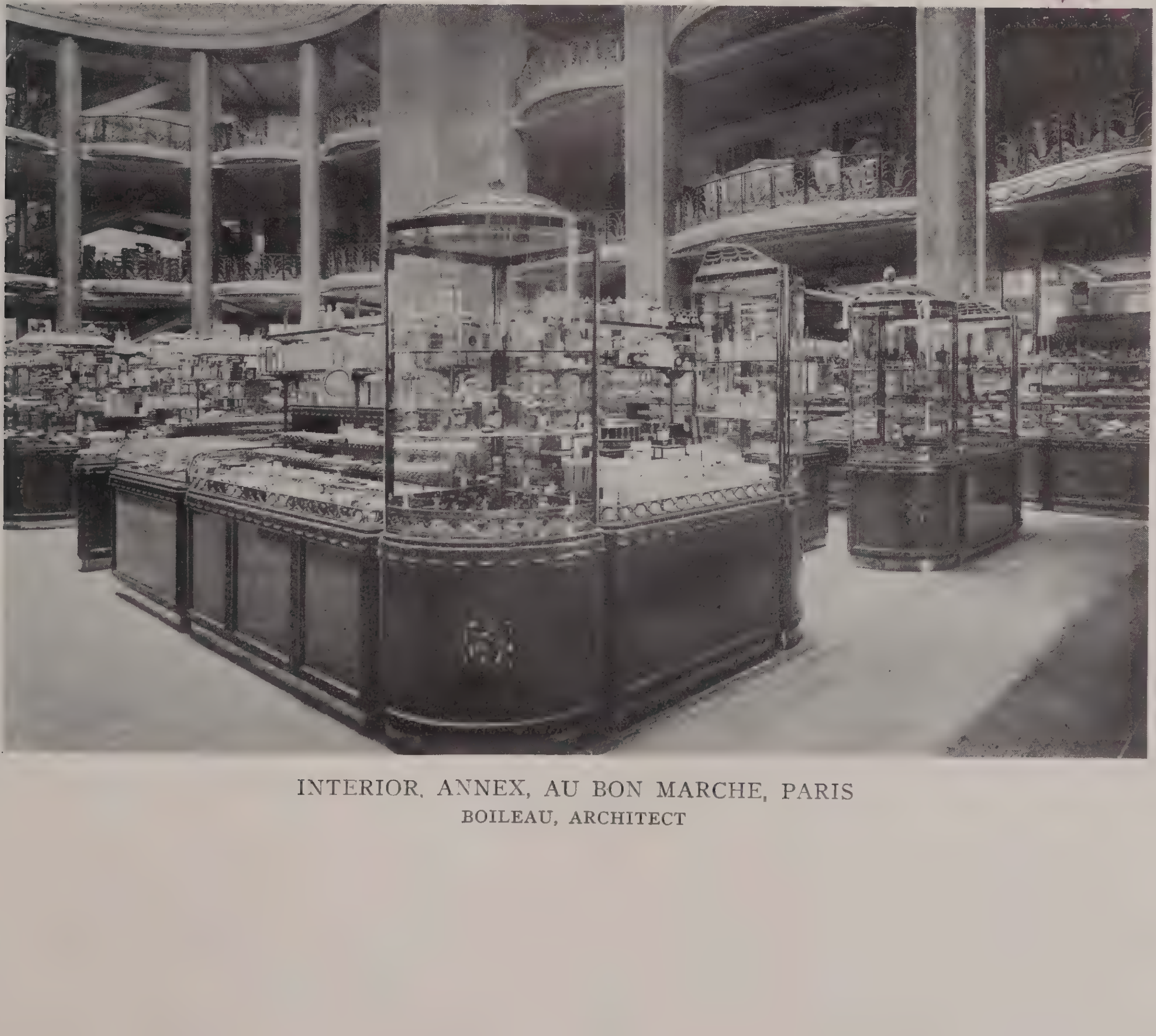
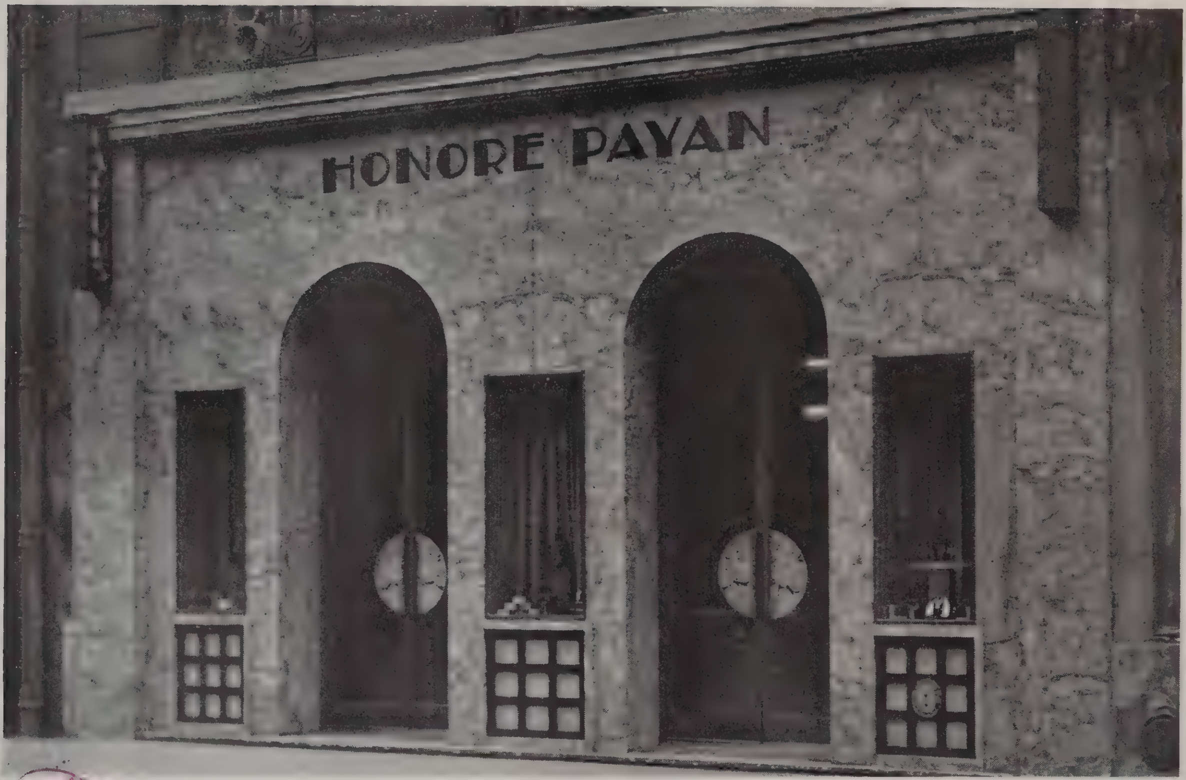
TAURADE, RUE VIGNON, PARIS
P. PETIT, ARCHITECT



ANNEX, AU BON MARCHE, PARIS
BOILEAU, ARCHITECT

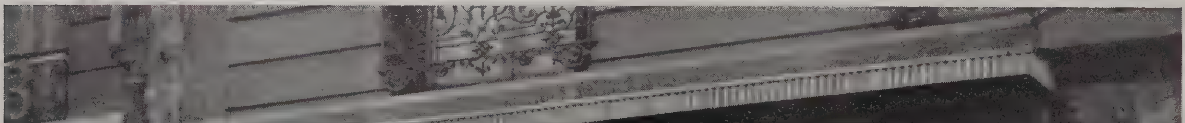


INTERIOR, ANNEX, AU BON MARCHE, PARIS
BOILEAU, ARCHITECT



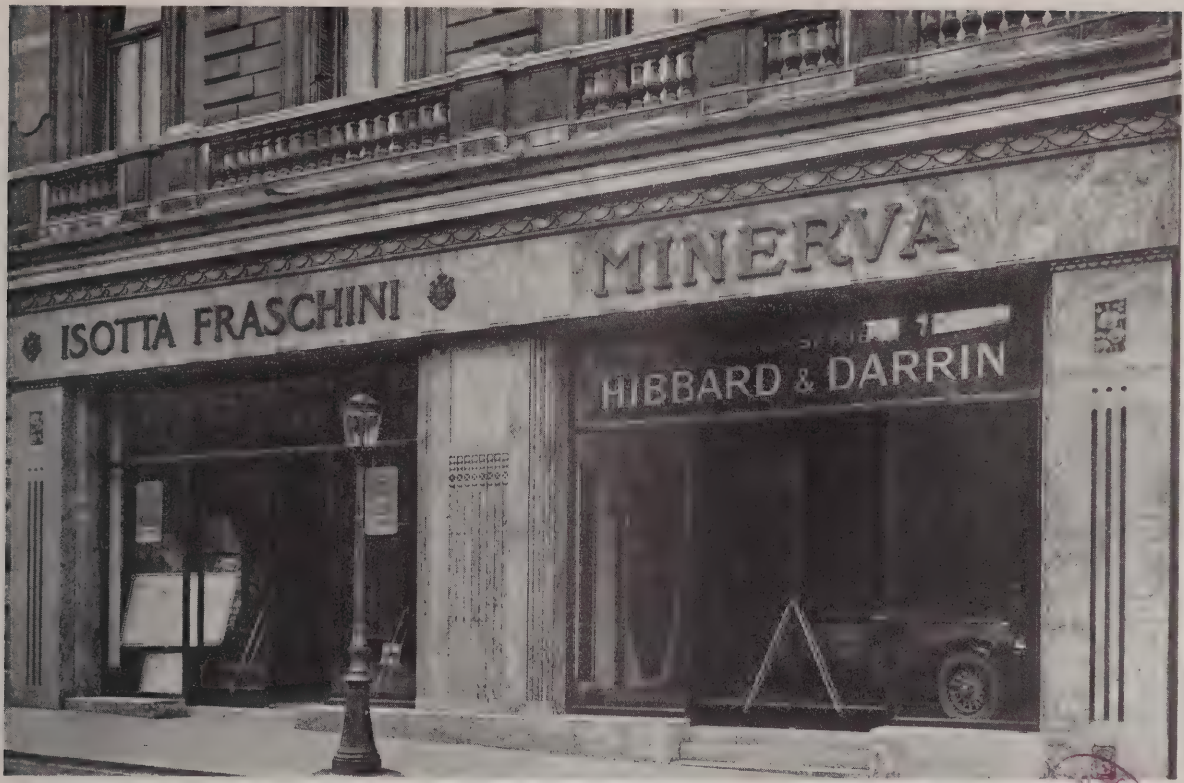
BOST

A PARISIAN PERFUME SHOP
ERIC BAGGE, ARCHITECT

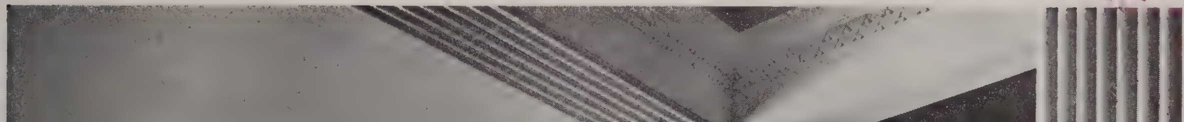


Photos. Bonney

ONE DESIGN USED FOR ALL NICOLAS WINE SHOPS, PARIS
PATOUT, ARCHITECT

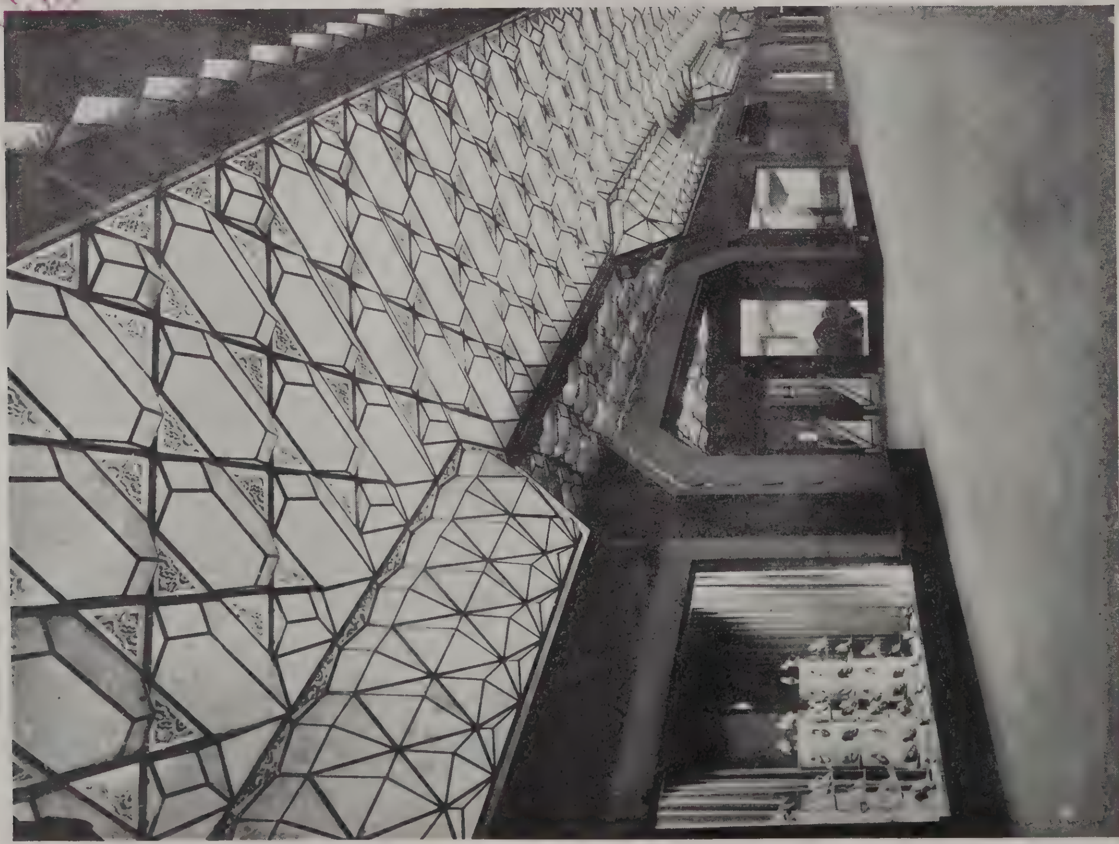


SHOPS, AVENUE CHAMPS ELYSEES, PARIS
ALEXANDRE RENAUD, ARCHITECT



Photos. Chevojon—Helio Faucheux et Fils, Chelles

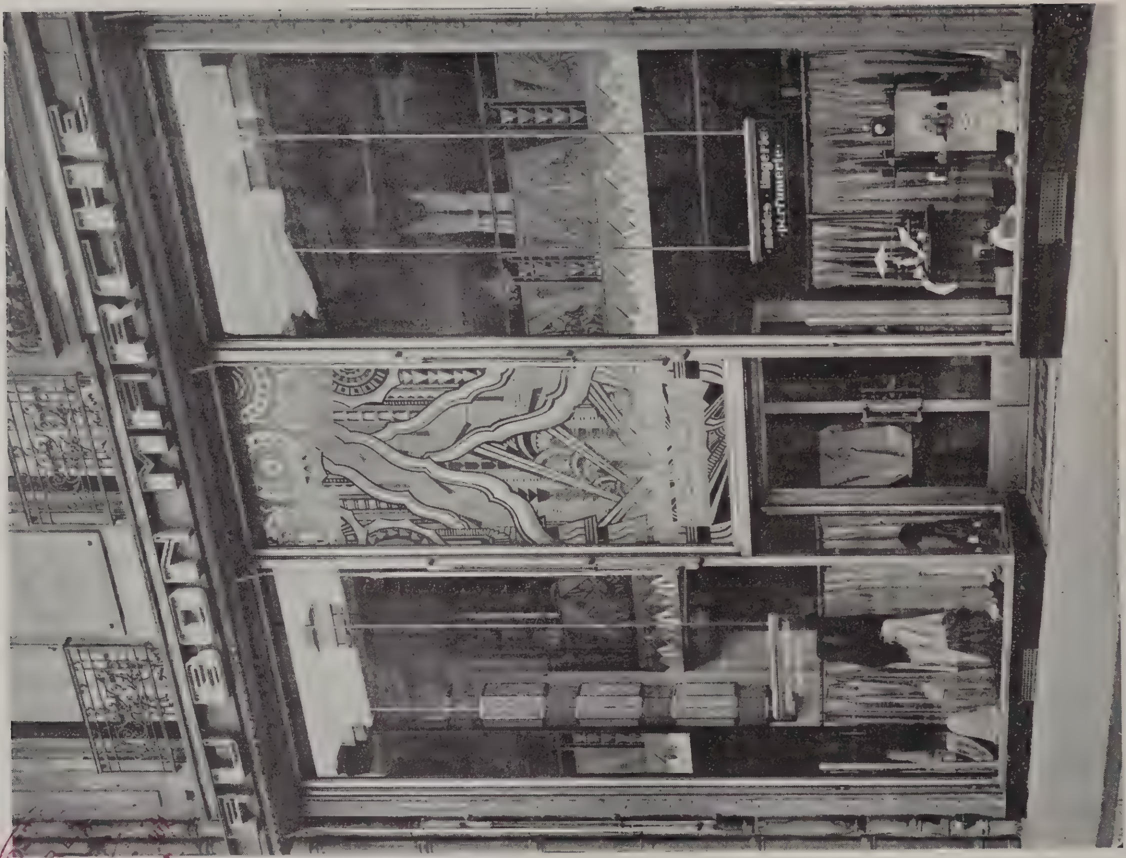
INTERIOR, MINERVA SHOP, PARIS
ALEXANDRE RENAUD, ARCHITECT



Photos. Helio Faucheux et Fils, Chelles

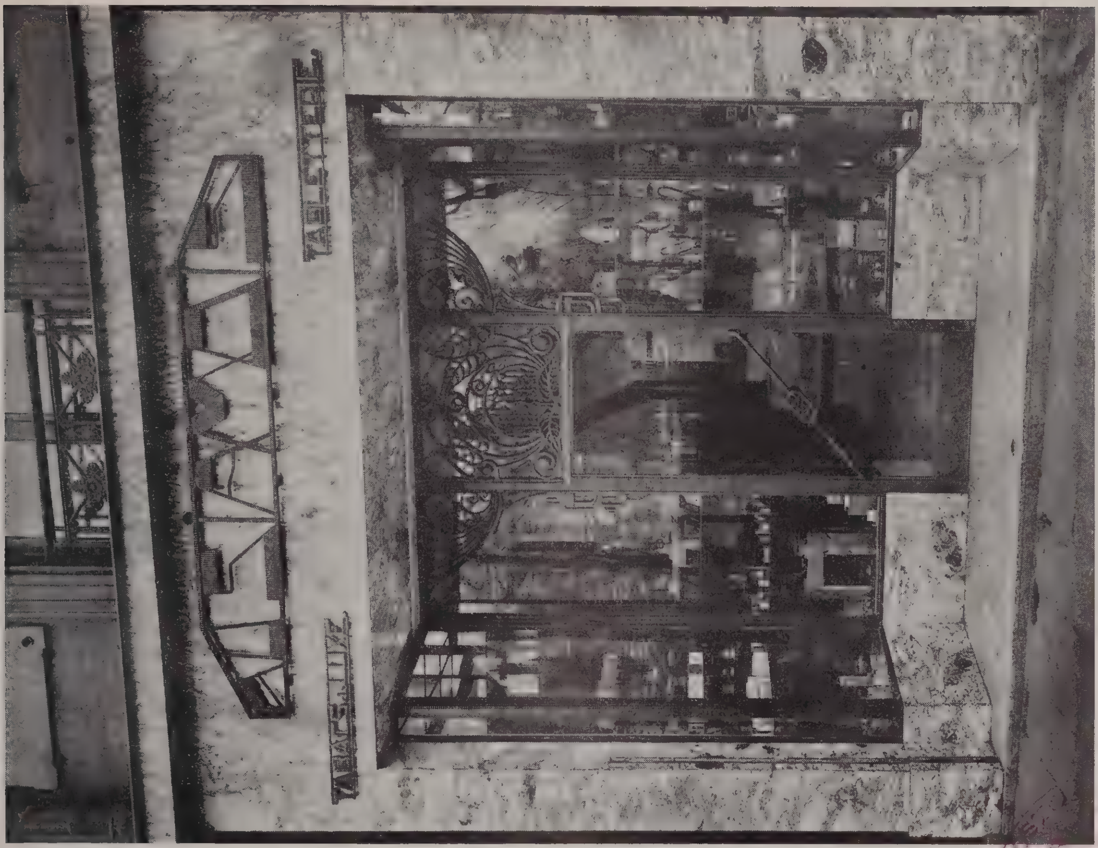
GALERIES LAFAYETTE, PARIS

CHANUT, ARCHITECT

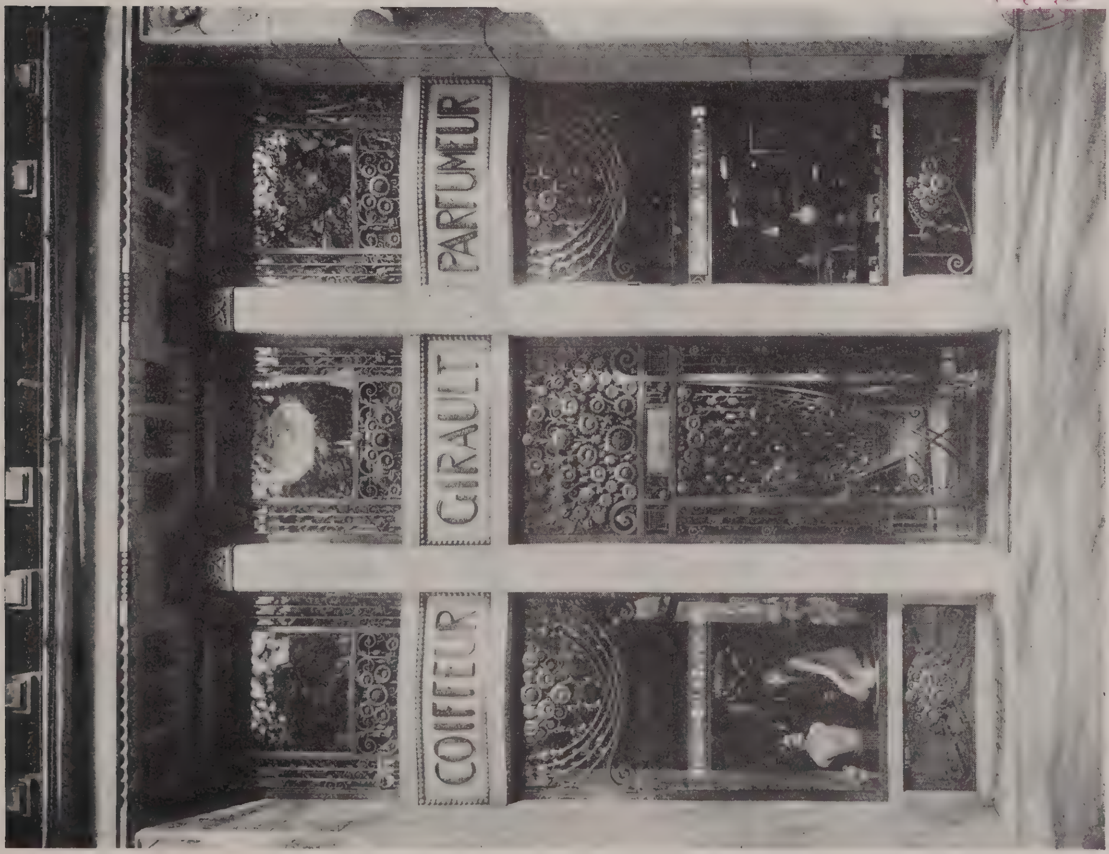


AU BON MARCHE, PARIS

BOILEAU, ARCHITECT

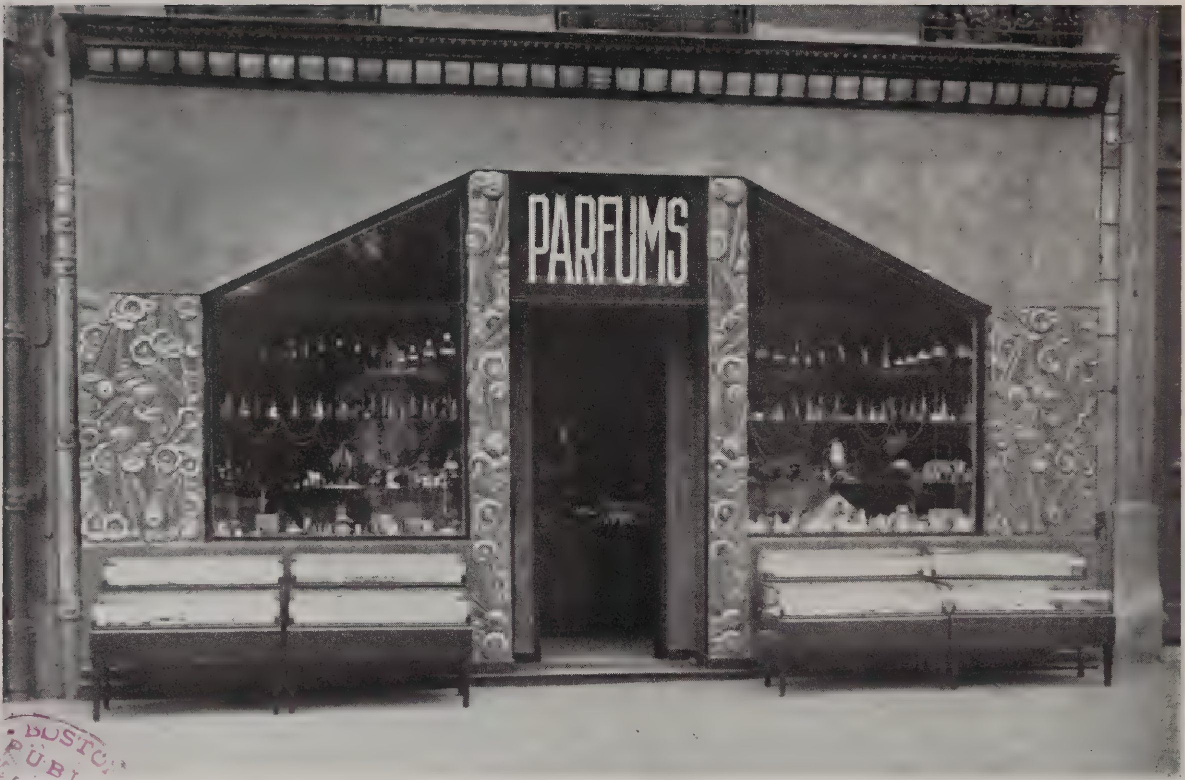


AU SIAMOIS, PLACE DE LA MADELEINE, PARIS
BOUCHE, DESIGNER



Photos. Chevojon—Helio Faucheux et Fils, Chelles

GIRAULT, BOULEVARD DES CAPUCINES, PARIS
AZEMA, EDREI ET HARDY, ARCHITECTS



BOSTON PUB

Photo. Bonney

A Perfume Shop, Paris

keen, and Europe has quickly realized that there is profit in a smart and forward-looking facade.

Historically, Germany and Austria have probably been the sources of inspiration. Paris, however, in the shop at least, has maintained a leadership for smartness and brilliance that in turn has affected Germany and led to increased excellence. The large stores of Germany,—Wertheim in Berlin, and the Tietz stores,—were, in their day, amazing examples of lavish enrichment,—a mark of commercial success that, without question, had great influence on the eventual development that followed. Built at the time that our own great, stereotyped boxes were being erected, they exhibited an astonishing variety of playful form,—interior detail that even after many years of intense production is decidedly interesting. In the view of today, when it is more correct to be chaste and abstract in form, they appear to be over-ornate and somewhat confused.

The Paris stores, of the Printemps type, the Louvre, Au Bon Marche, resemble their German competitors in their general types. To the American eye, the plan of the store seems hopeless, with every exposed spot either crowded with decoration or merchandise,—or possibly with both. In spite of that, however, these shops seem alive, interesting, brilliant, chatty possibly,—the kind of institution that apparently the public of Paris desires. The exteriors have recently been rebuilt so as to obtain the advantages of large sheets of glass and interesting illumination. The Galeries Lafayette has a great shelter of metal and glass over a plain marble wall, pierced by windows. In the evening various effects of light are used, and the result accomplishes what may be the purpose,—drawing the populace to the building to see the merchandise on display and entertaining it gratuitously at the same time. There is a marked line of cleavage between the large establishment and the small store, with the obvious advantage to the smaller that the problem in design, being far more direct, the solution is more evident and permits variations that are more entertaining. The French have the blessed advantage over us of not having high powered salesmanship to urge one sort of stock detail or another on the store owner. The American designer finds his client armed with half formed knowledge of so much that the very approach to securing something fresh is blocked at the outset. The French have, furthermore, the advantage of still possessing artisans in various materials whose skill and resources are available on a financial basis that is within reason. Experiments are possible, and they are encouraged.

One element in American store design which seems to be quite characteristic of our own situation is that most stores are contained in structures built for investment, where at the moment of

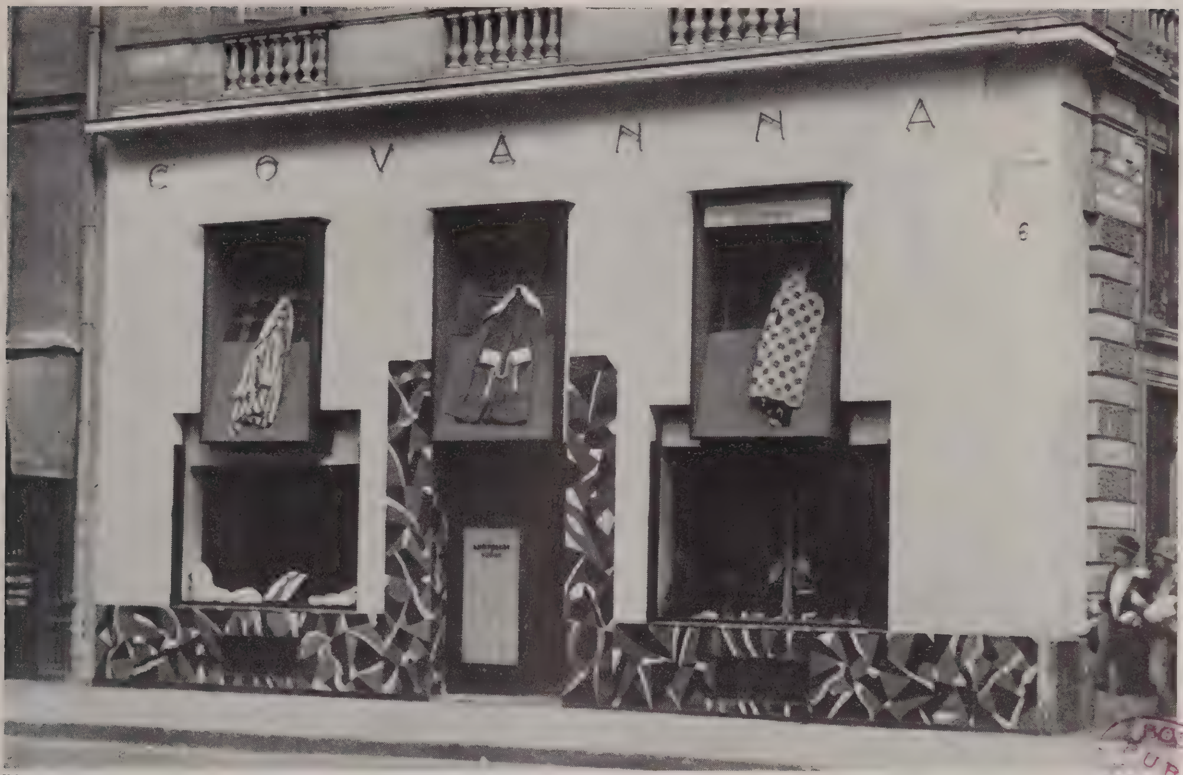


Photo. Bonney

The Covanna Shop, Paris
Patout, Architect

design the eventual occupant is unknown; or even should he be in the picture, it is considered advisable to regard him as a transient for the term of his lease. The tenant is permitted under certain restrictions to do more or less what he likes inside his window; usually the exterior remains unchanged. Bulkheads that develop show windows are roughly 20 inches from the sidewalk,—too high by far for furniture, and too low for jewelry, shoes and smaller articles. The glass window of the store itself becomes maximum in size. Under the absurd dictum that causes stores to be rented by the foot of frontage, the tenant assumes that the mystery of business success is fathomed by having huge areas of glass, and brave indeed is he who pays on this basis and decides that it may be intelligent to adopt a new policy of display. The Paris stores are agreed on the principle of using glass entirely in relation to what should be displayed more or less as the case may be. For an example, one might examine the Bally store on the Boulevard de Madeleine, designed by Robert Mallet-Stevens. A horizontal opening in a shiny white metal surface is just high enough to comfortably display shoes; the remainder of the facade is arresting in its absolute simplicity, the interest lying entirely in the display frame and the wall of metal in which it appears to be cut. The various pieces of silver metal are riveted together with gilt rivet heads, forming an interesting pattern on the surface. The directness and pure quality of this design are particularly illuminating in comparison with some recent shops carrying similar merchandise that have appeared on Fifth Avenue.

The Nicholas liquor stores throughout Paris are equally simple and unpretentious. The German development is much the same; the display openings, their proportions, sizes and the materials employed, appear to have an intimate relation to the store and its contents. The Sarotti shops in Berlin are a chain group that sell candies and confections as is done by our own chain systems. As far as their artistic interest is concerned, they are of a wholly different world. In them are charm, graciousness, imagination, whimsicality; in ours is a feeling of one more lever having been pulled, and presto! a new store is ready. In this connection it seems to be futile to combat mediocrity by constantly assailing the architect. The owner is an important obstacle, no doubt, though it may be true that very much more latitude might be given the designer if he were to propose variations that he might assume to be beyond acceptance under normal conditions. The inhibitions are, unfortunately and quite often, solely those of the designer. The American merchant responds quickly to suggestions embodying novelty and presuming the good judgment of his adviser; his own acumen would probably supply the

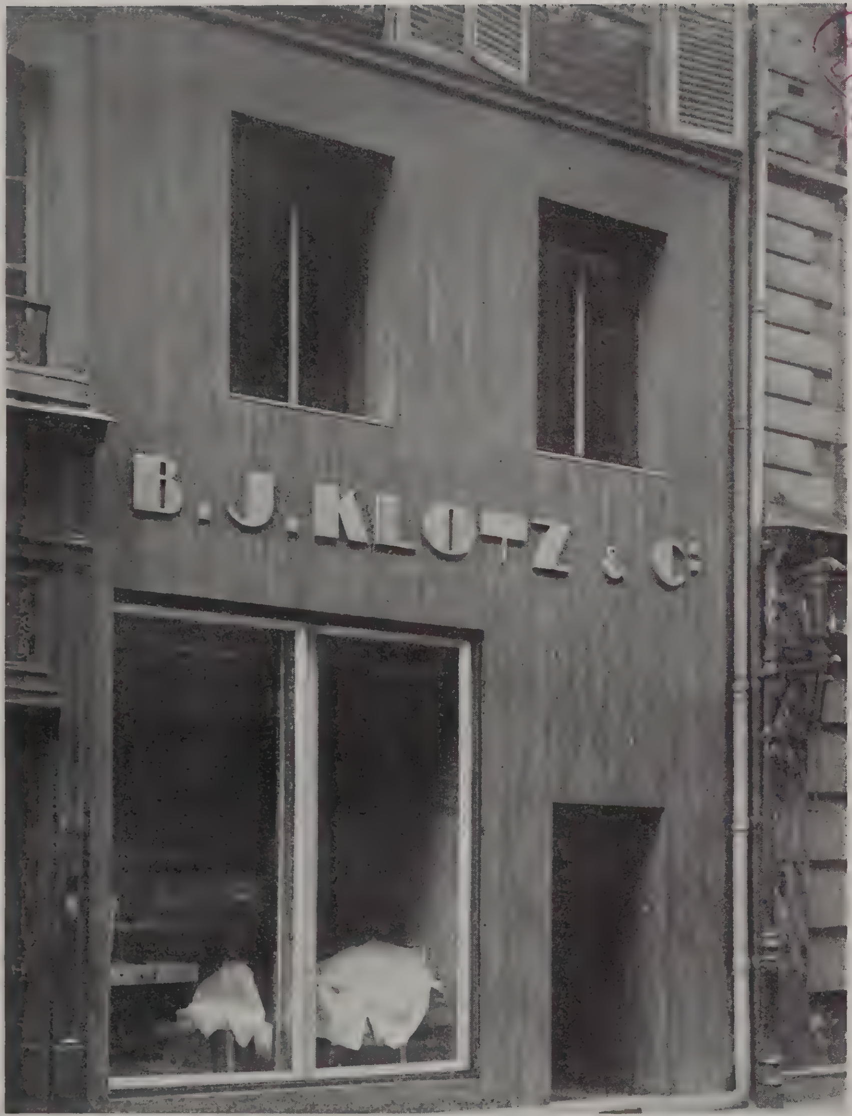
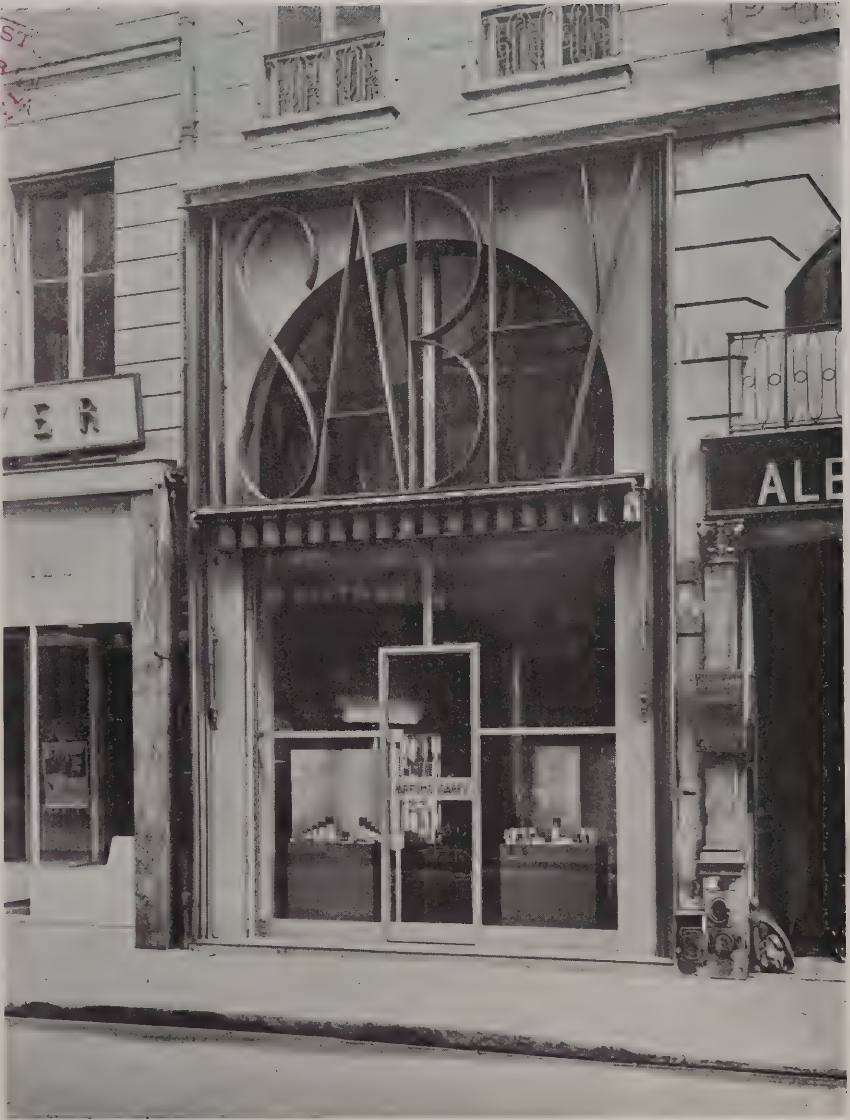


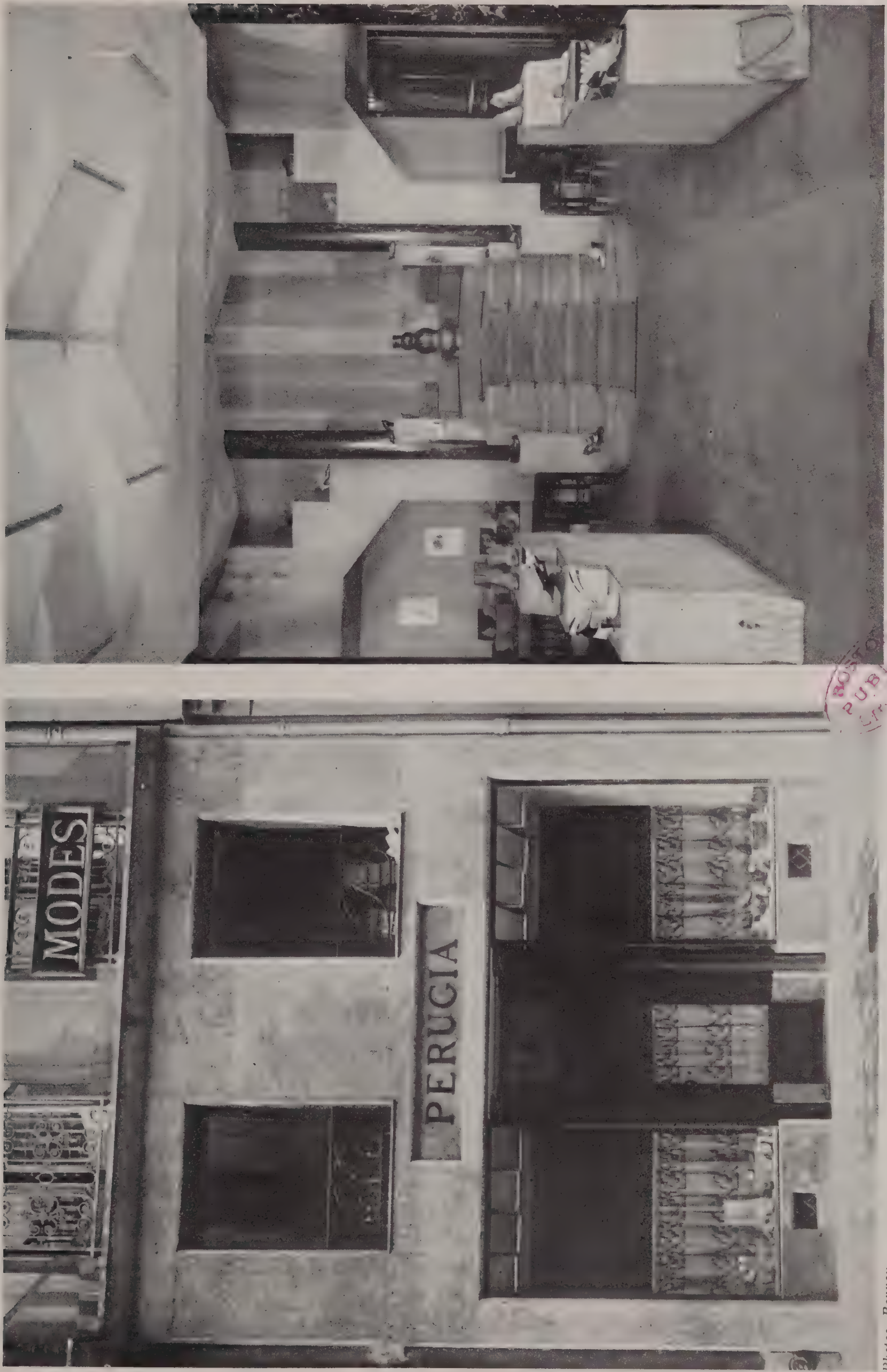
Photo. Bonney

KLOTZ SHOP, PARIS



Courtesy of Contempora, Inc.

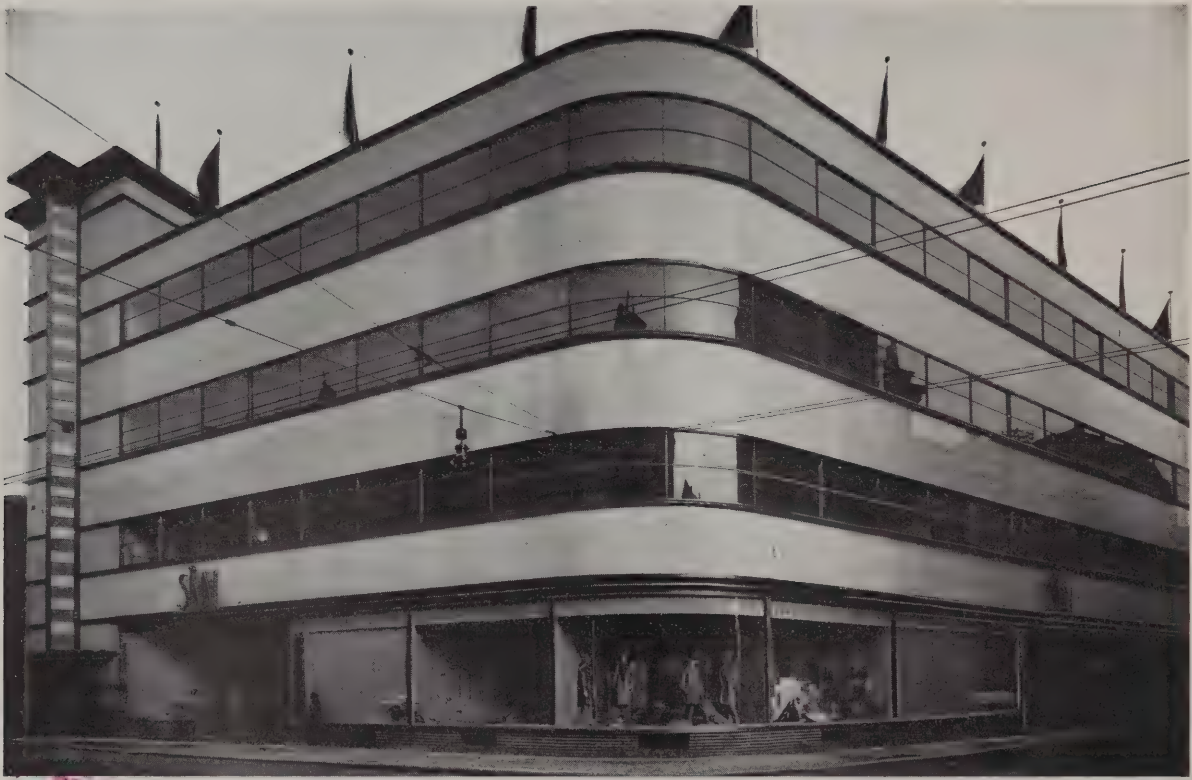
ISABEY SHOP, PARIS
HERBST, DESIGNER



Photos. Bonney

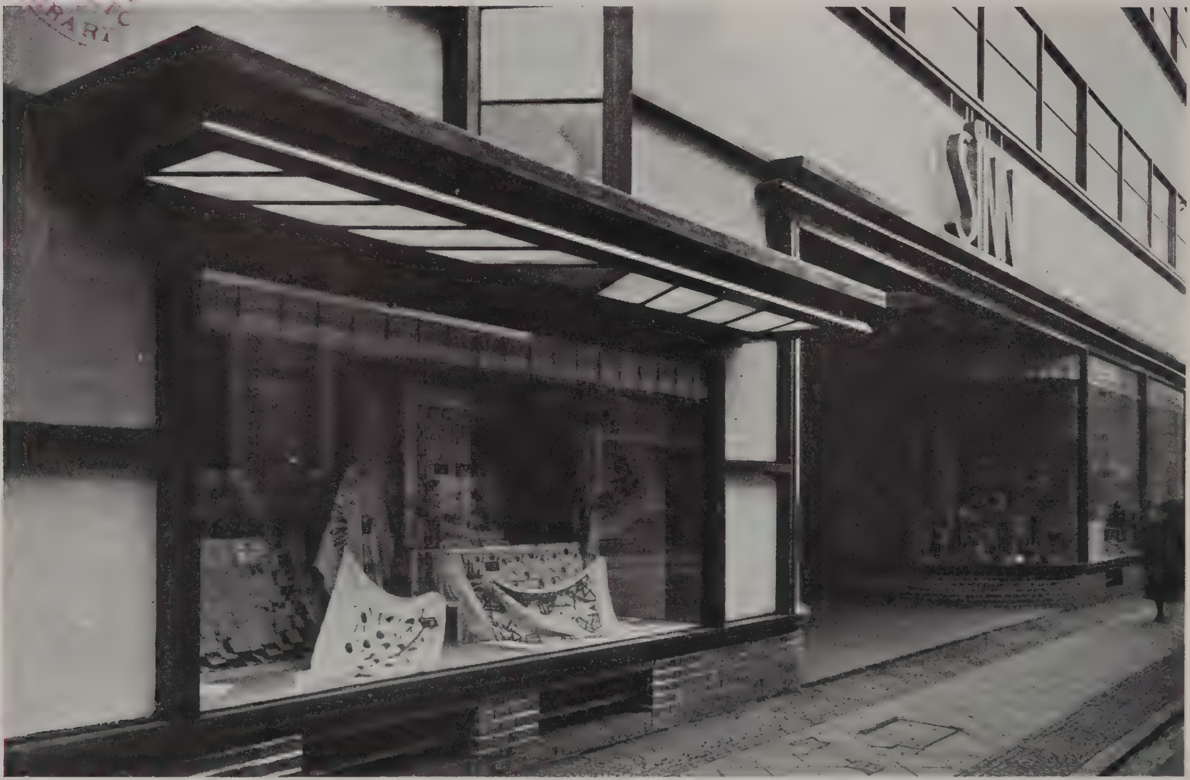
PERUGIA SHOP, PARIS
PERUGIA, DESIGNER

BOSTON PUBLIC LIBRARY



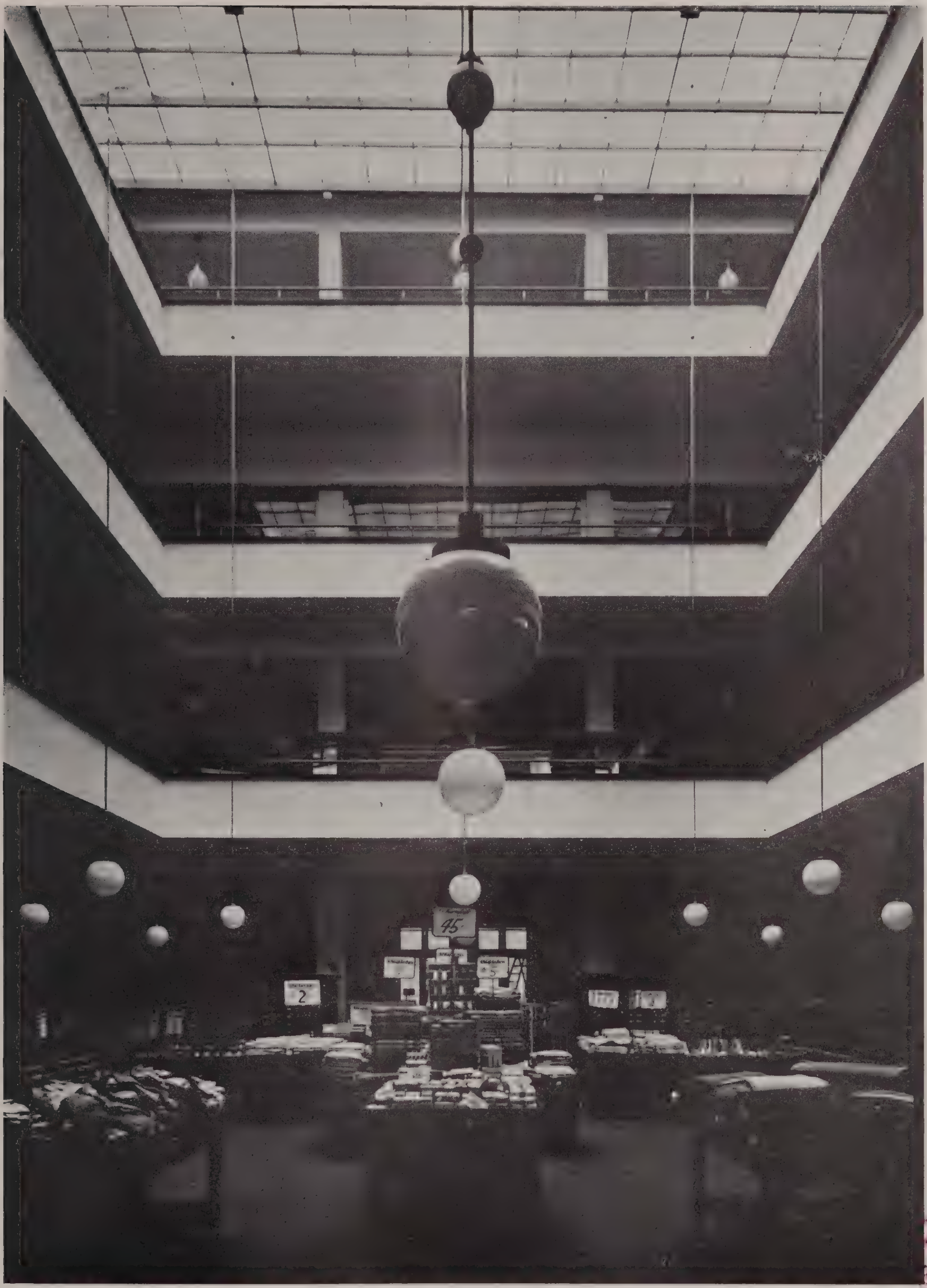
GENERAL VIEW

BOSTON PUBLIC LIBRARY



Courtesy of Contempora, Inc.

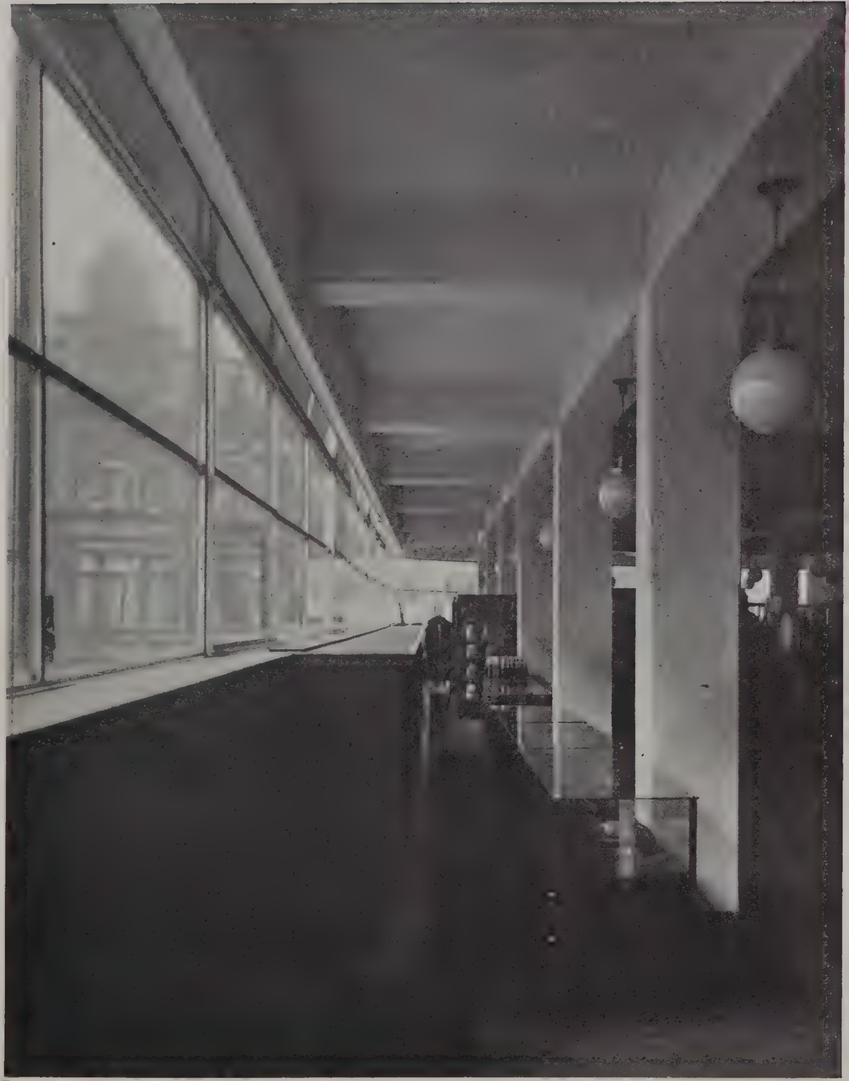
SHOW WINDOW AND ENTRANCE
A DEPARTMENT STORE IN GERMANY
BRUNO PAUL, ARCHITECT



Courtesy of Contempora, Inc.

INTERIOR, DEPARTMENT STORE IN GERMANY
BRUNO PAUL, ARCHITECT

BOSTON PUBLIC LIBRARY



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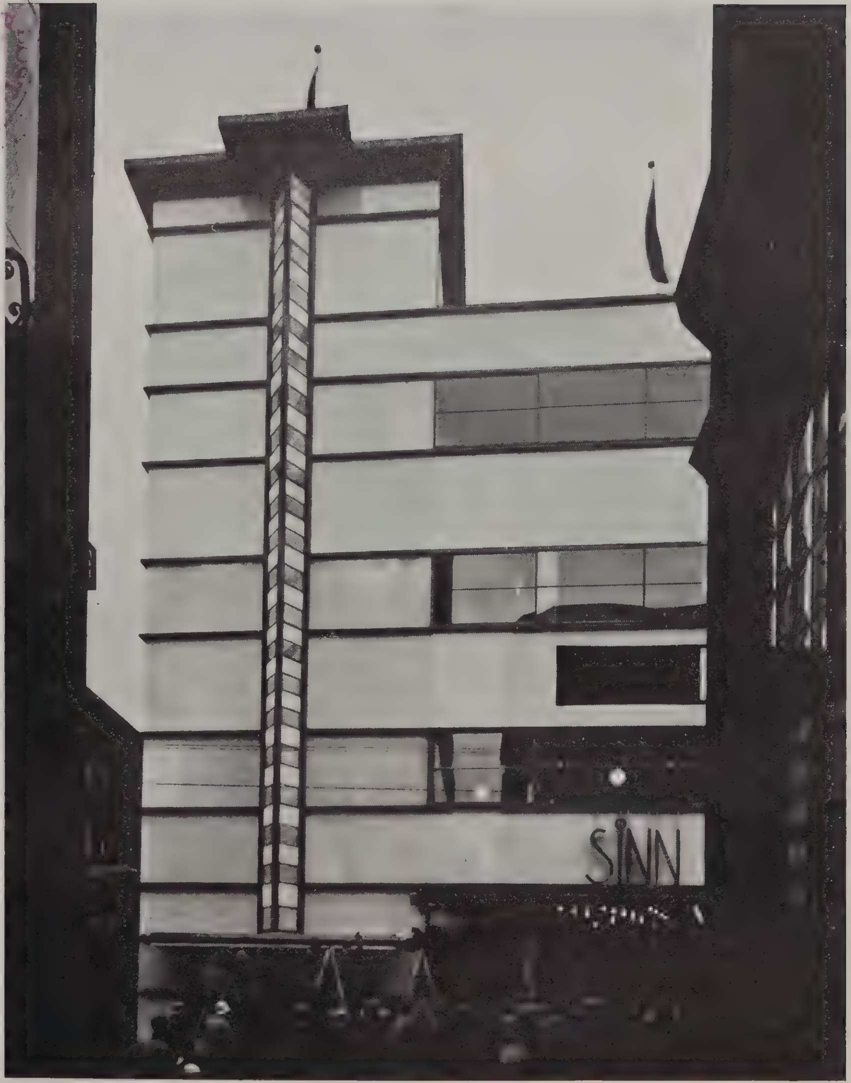
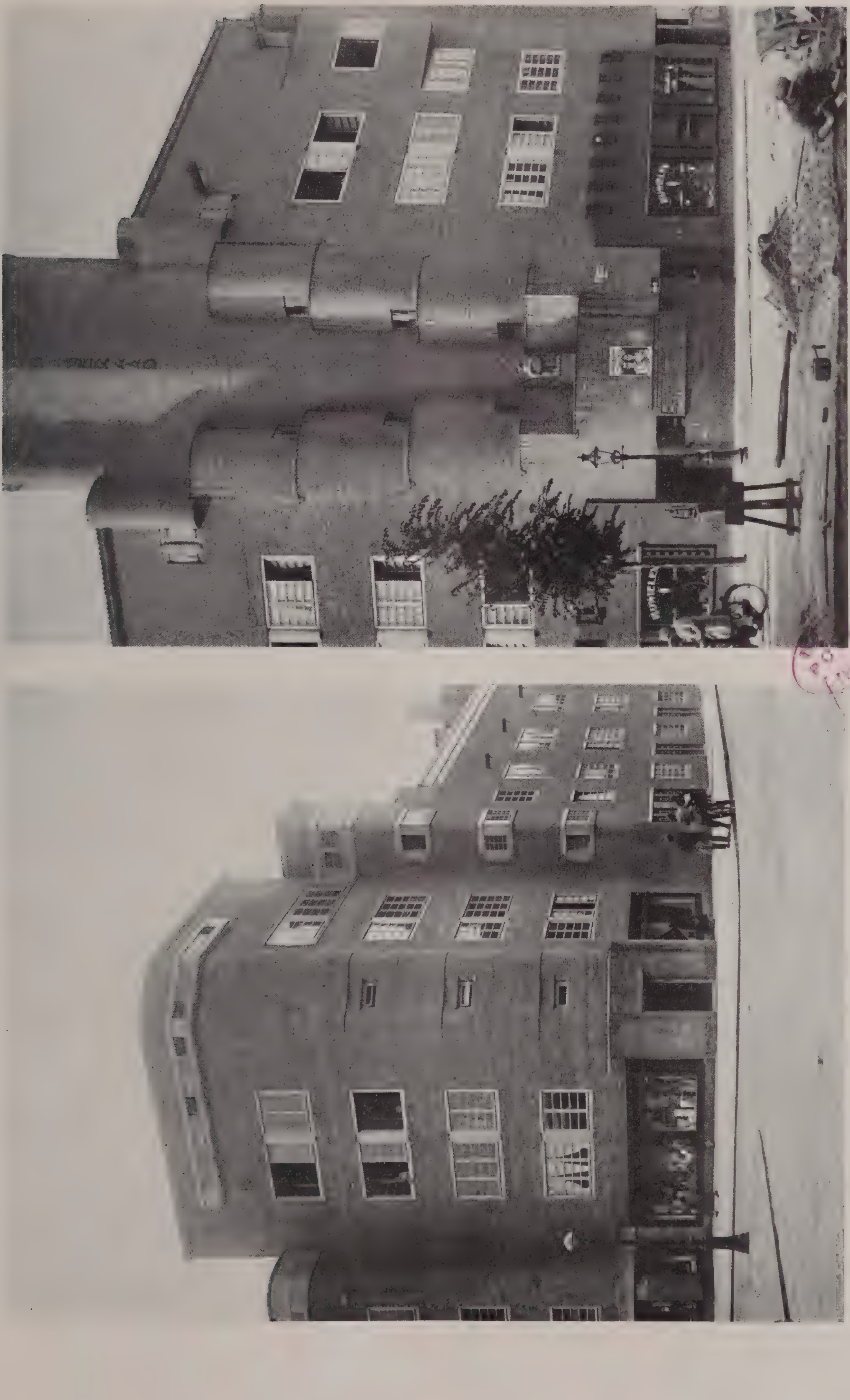
CONTINUOUS WINDOWS



STAIR TOWER

DEPARTMENT STORE IN GERMANY
BRUNO PAUL, ARCHITECT



Photos. Bonney

BASEMENT SHOPS UNDER APARTMENT HOUSES, AMSTERDAM

KRAMER, ARCHITECT

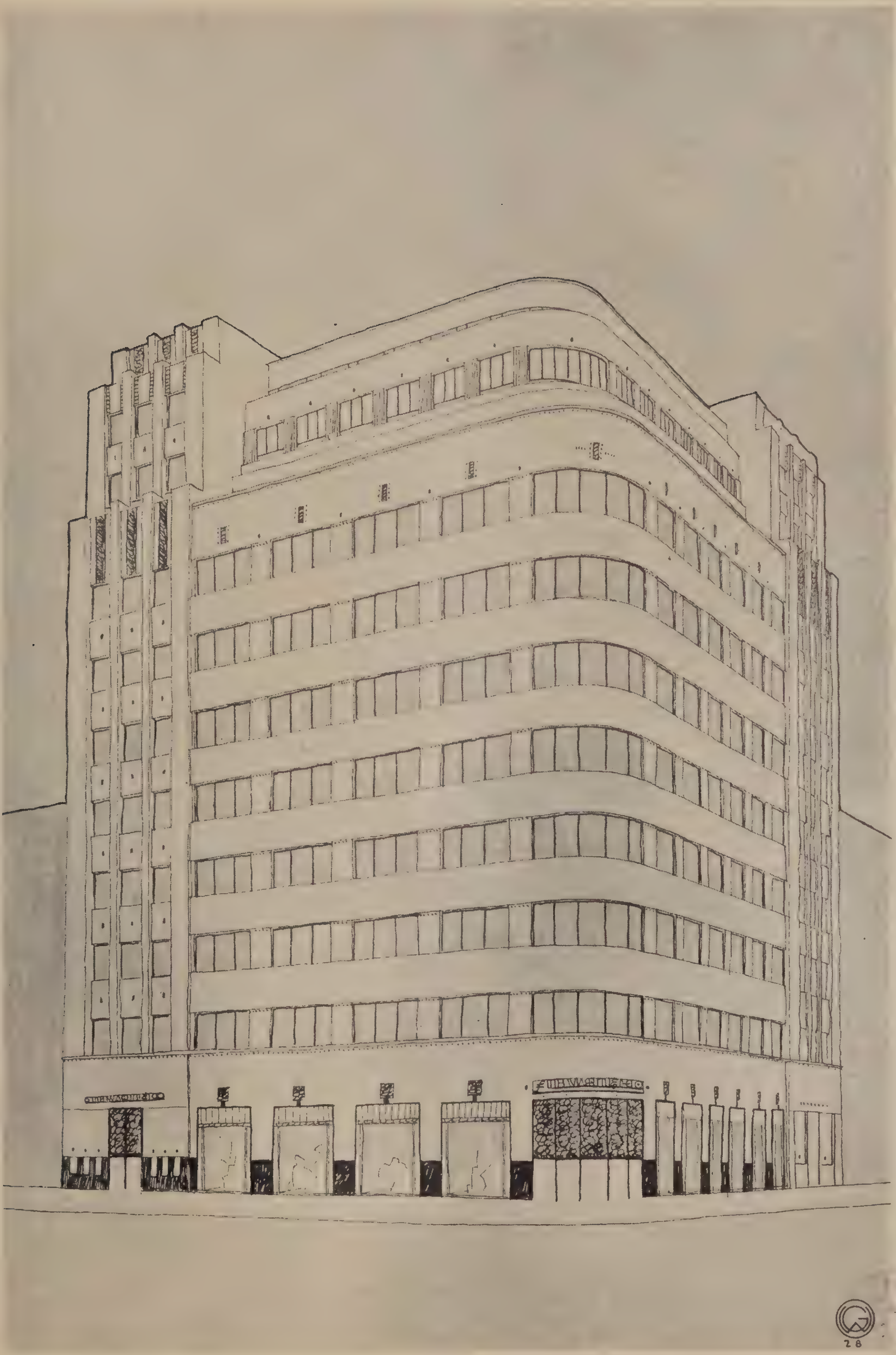
restraint necessary for avoiding mere eccentricity.

Regarding Europe, outside of France and Germany, Austria, or rather Vienna,—which unfortunately is all that the country still owns,—has a few men whose abilities are of the first rank. So little has been done, however, that even their efforts can be discounted in their international importance. Holland has become very nationalized, with a style that in part is of enormous interest. Here again, however, the designers have so specialized and individualized their work that to the foreigner it smacks too much of decoration *per se,* having little of the combined logic and charm that may be discovered in Paris on every side. England is slowly feeling the pressure of a living and growing movement in the arts, and with its customary deliberation, it is reasonable to presume that any actual development of value will take a long while to flower. One returns to America astonished that so little of real worth has been accomplished. Let us frankly omit reference to correctness and the mediocrity of most work that in general is creditable but lacking in that particular element that marks accomplishment. It is not a question of assuming that Europe is in advance of American architecture, but that in this particular field, the store, where the proper relation of design, interest and merchandise is necessary, many Europeans seem to have a sense of fitness that combined with imagination and skill has produced work of unusual value.

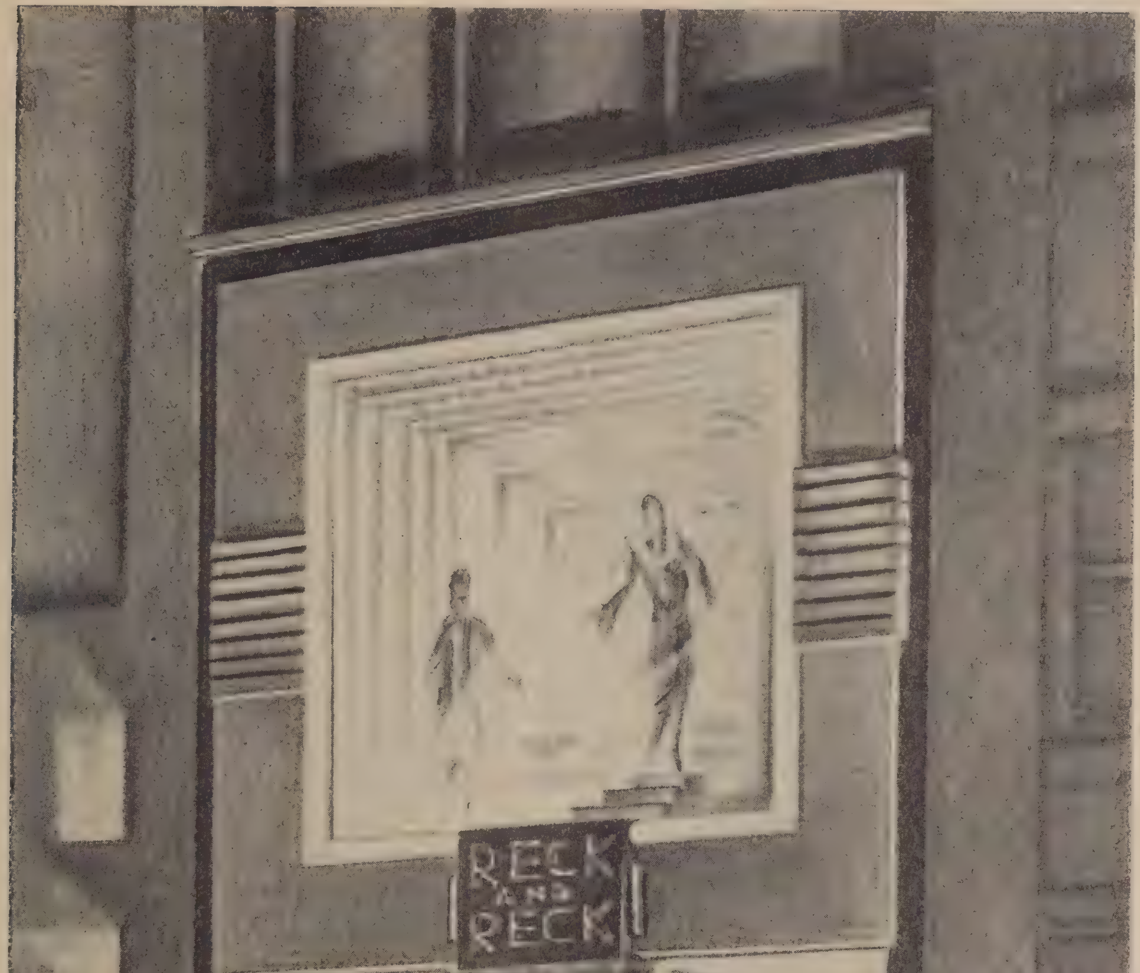
Among the particularly interesting contemporary features are those of illumination. Many stores in Europe have employed the tubular lamp not merely for commercial lettering, as we insist on doing, but as a decorative adjunct of the design. The lamps either form accents to the design itself, or are used for attractive lettering that forms an integral feature of the composition. The glass of the window is still kept on a vertical plane in most examples, here or abroad. Presently it will be noted, as the automobile engineers long ago discovered, that perfect visibility is only possible through tilting the glass slightly so that the rays of refraction of light are not annoying and permit full vision.

As a summation of the qualities of the European work, it would seem to be evident that in the first instance simplicity is dominant. Most of the quarrel with the old work is that it is burdened with applied decoration that has absolutely no significance to our generation. The beauty of a plain surface, relieved in whatever way the artist may desire, is the ideal. After all, there is no new principle involved, for through all time the same theory has dominated those works that remain to us as masterpieces. The modernist uses his material so as to make it beautiful in itself. Marble, glass, fabrics, wood, do not need applied decoration to glorify their beauty or texture. The problem, simplifying itself to a matter of form, contrast or proper use of material, demands excessive study, and quite naturally the uninitiated assume that baldness and simplicity are akin. Nothing is more striking than to see on the boulevards in Paris a simple gem such as that of Mallet-Stevens, and nearby a pompous rebuilding of a large store, where the designer simply covered a surface of enormous size with slabs of flat marble. With the window openings of unpleasant proportions and the lettering bad, the effect is distinctly disturbing. The final analyses would seem to hold that the present mode requires the sensitive and minute study that the production of any simple form requires. The designer need not fear as to style, for most of the work that involves characteristically decorated forms based on geometric patterns is tiresome in its repetition and will not last. But the clarity of the new movement, its intelligence and its imaginative courage, may conceivably carry it far.

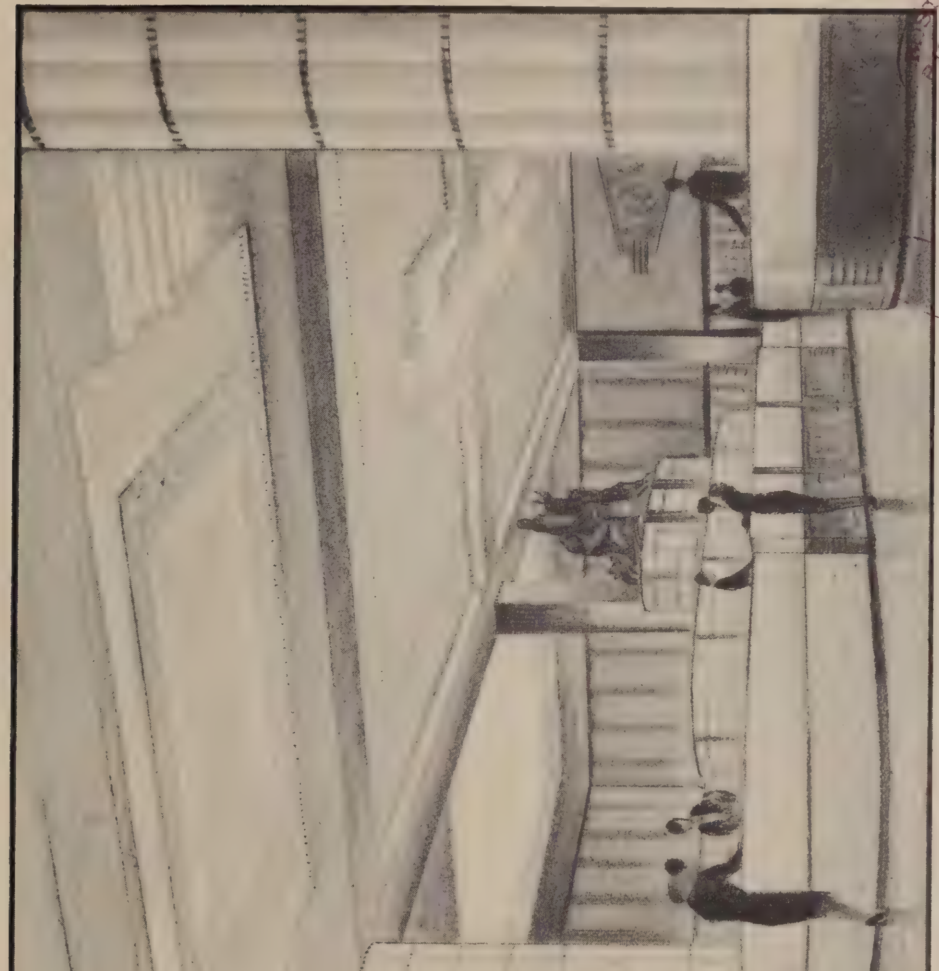
Editor's Note. The Architectural Forum was fortunate in securing the services of Ely Jacques Kahn in the preparation of this interesting and valuable article on The Modern European Shop and Store. No one of the several American architects today specializing in commercial and mercantile buildings has met with greater success in the development of a consistent and logical expression of these two conspicuous types of contemporary American architecture than has Mr. Kahn. In each successive example of his work a greater freedom of expression, a deeper understanding of the proper use of modern architectural ornament and decoration, and the successful and appealing use of color in exterior architecture is evident. No one understands or appreciates better than does Mr. Kahn the charm and originality shown in the modern French shop front. He believes, as we do, that in mercantile, commercial and semi-public architecture, such as clubs and restaurants, the modern expression in architectural design and interior decoration is consistent, appropriate and inspiring. Furthermore, although in the field of domestic architecture the profession in America has thus far been slow to utilize the newly conceived style, it is our belief that the next few years will bring forth successful and pleasing examples of domestic architecture,—both urban and country,—designed under the influence of and definitely expressing the new freedom from precedent which is today characteristic of many of the best examples of commercial and mercantile architecture. This new or contemporary style is undergoing a rapid and constantly changing development. As to what form of expression it will show five years from now, it is interesting to speculate.



SKETCH FOR PROPOSED STORE BUILDING, NEW YORK
WHITMAN & GOODMAN, ARCHITECTS

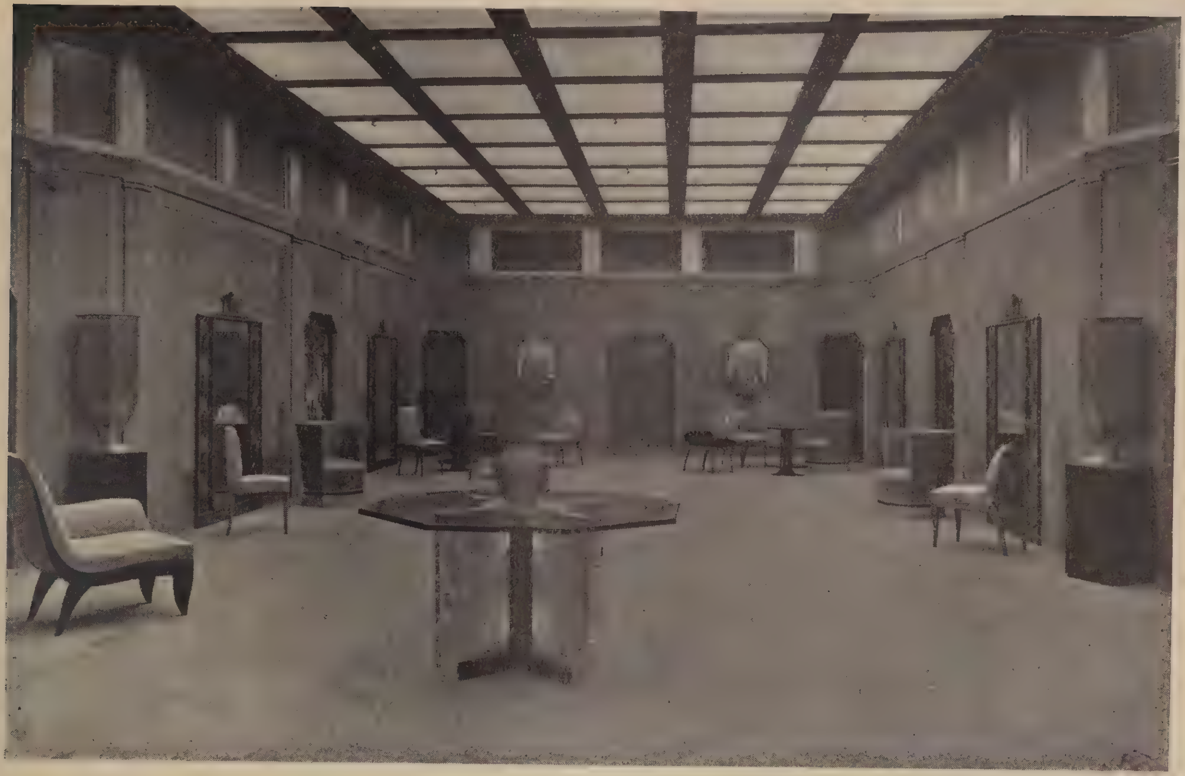


SKETCH FOR A PROPOSED SHOP, NEW YORK
WHITMAN & GOODMAN, ARCHITECTS

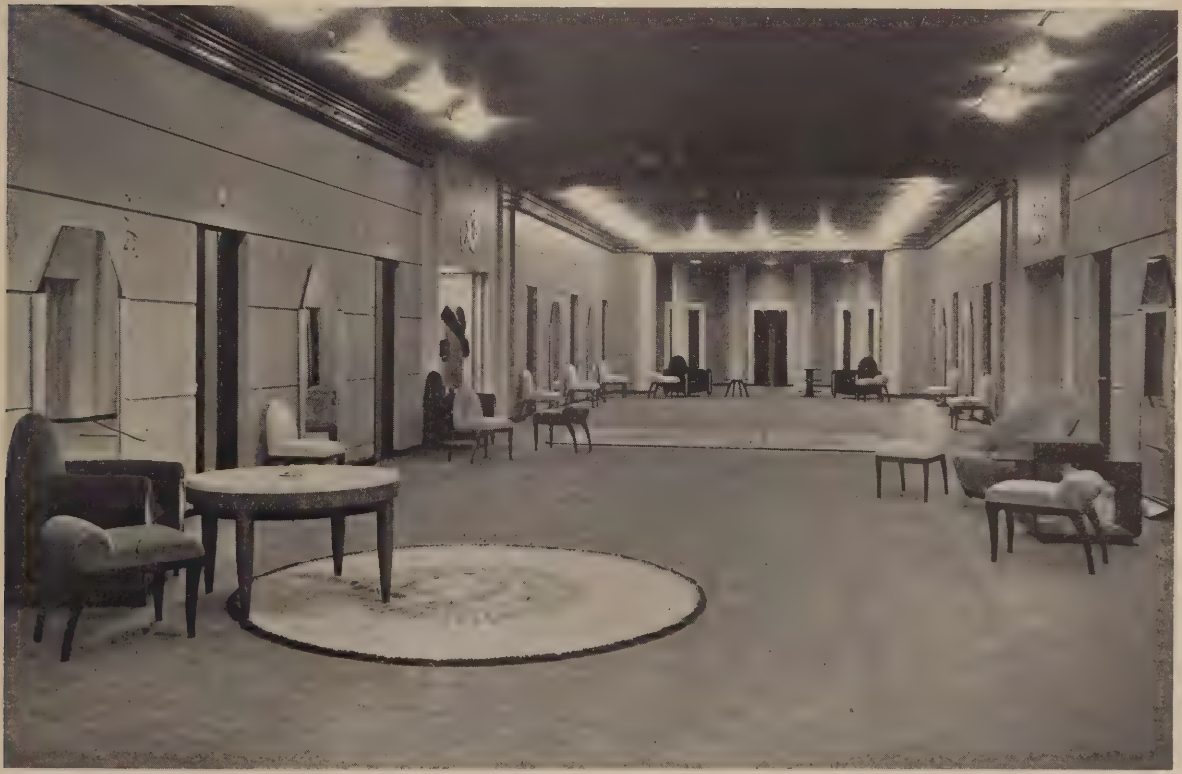


SKETCH FOR ENTRANCE FLOOR, STEWART & CO., NEW YORK

WHITMAN & GOODMAN, ARCHITECTS



DRESS SALON

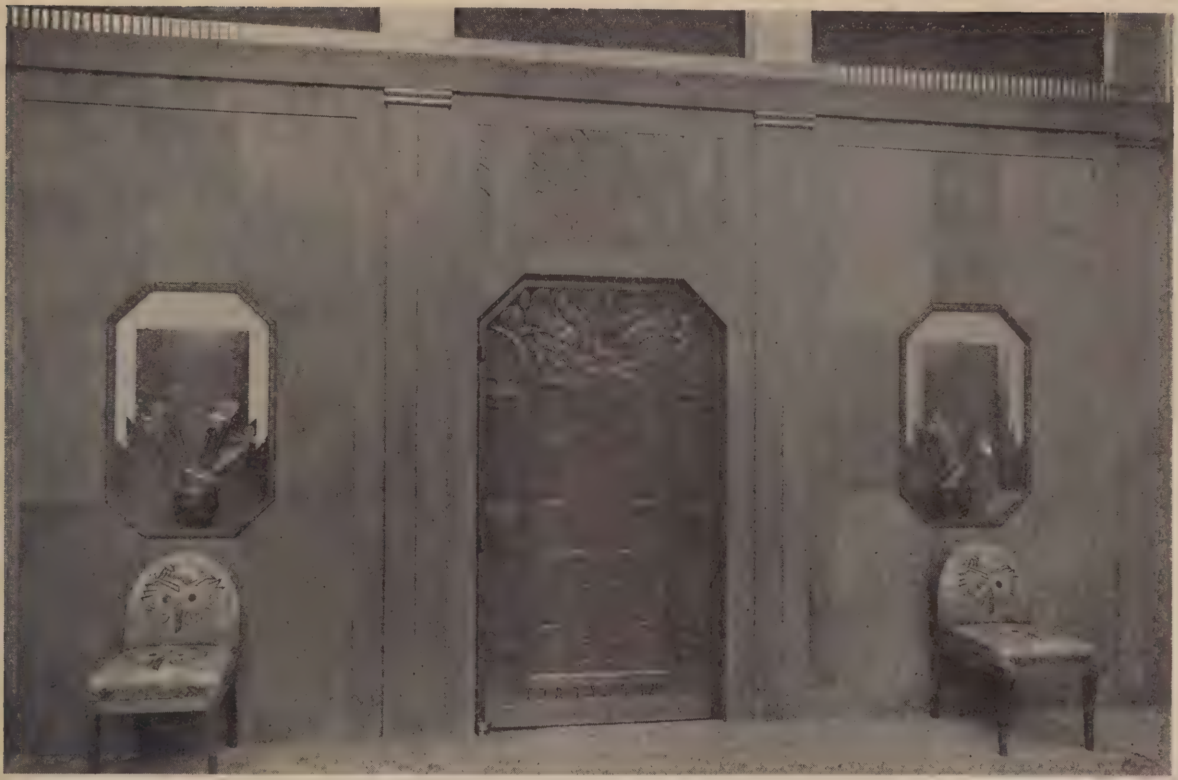


Photos. S. H. Gottscho

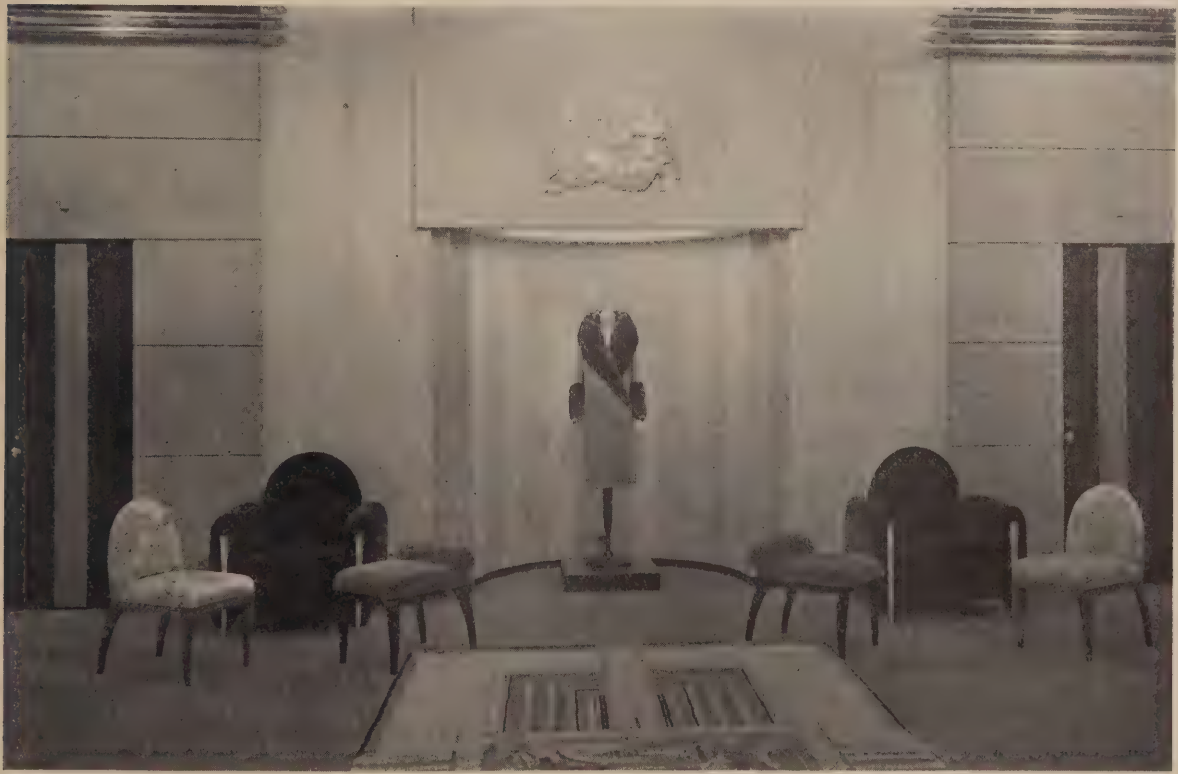
COAT DISPLAY SALON

JAY-THORPE SHOP, NEW YORK

WHITMAN & GOODMAN, ARCHITECTS



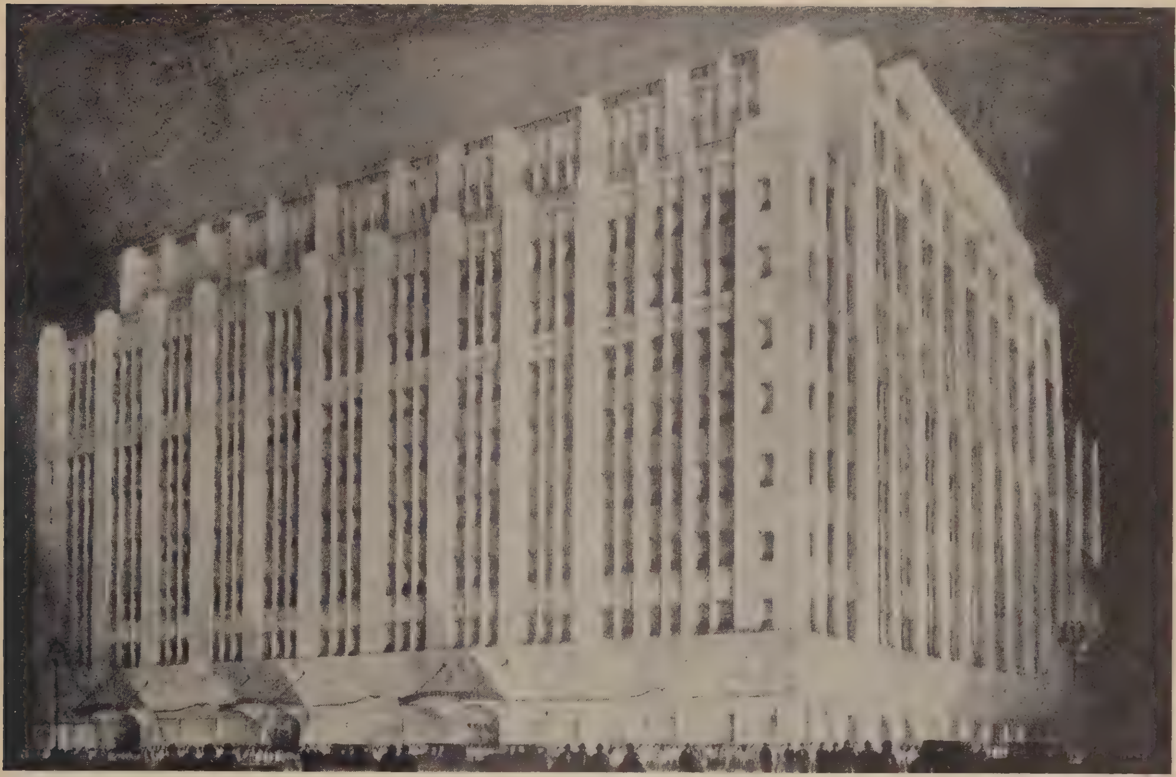
DETAIL, DRESS SALON



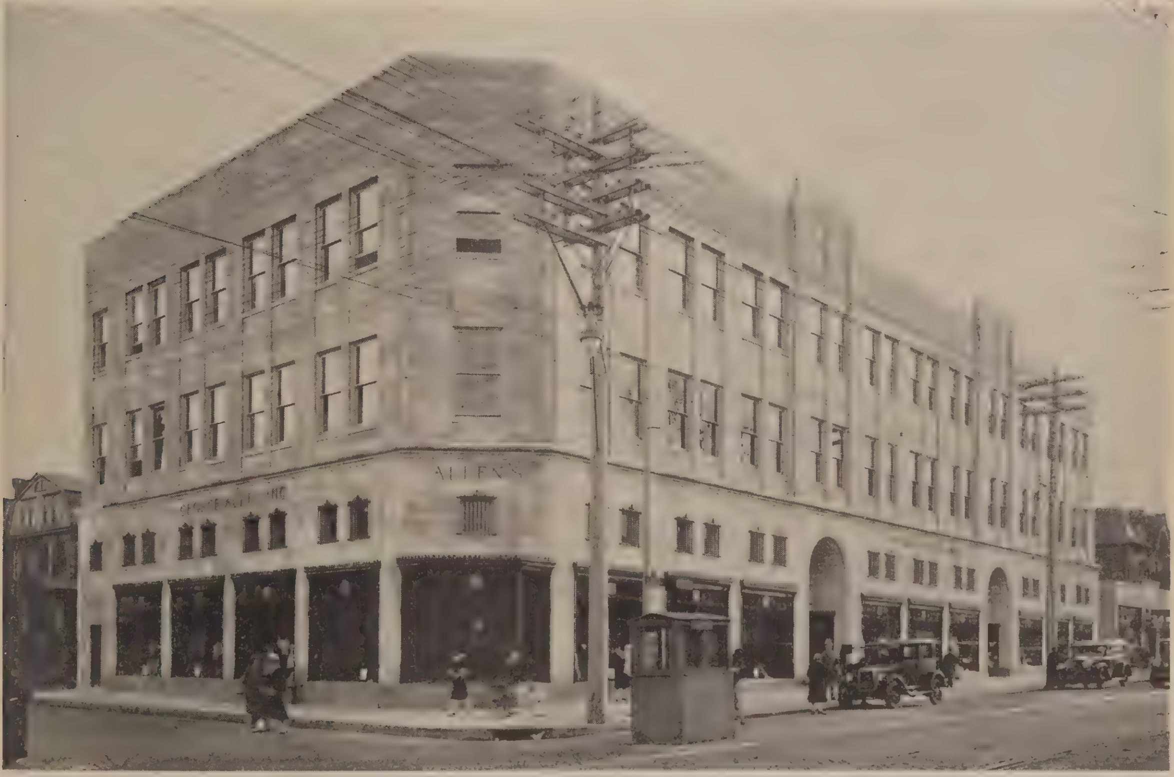
DETAIL, COAT DISPLAY SALON

JAY-THORPE SHOP, NEW YORK

WHITMAN & GOODMAN, ARCHITECTS



PROPOSED ABRAHAM & STRAUS BUILDING, BROOKLYN N. Y.
STARRETT & VAN VLECK, ARCHITECTS



GEORGE ALLEN STORE BUILDING, PHILADELPHIA
CLARENCE E. WUNDER, ARCHITECT

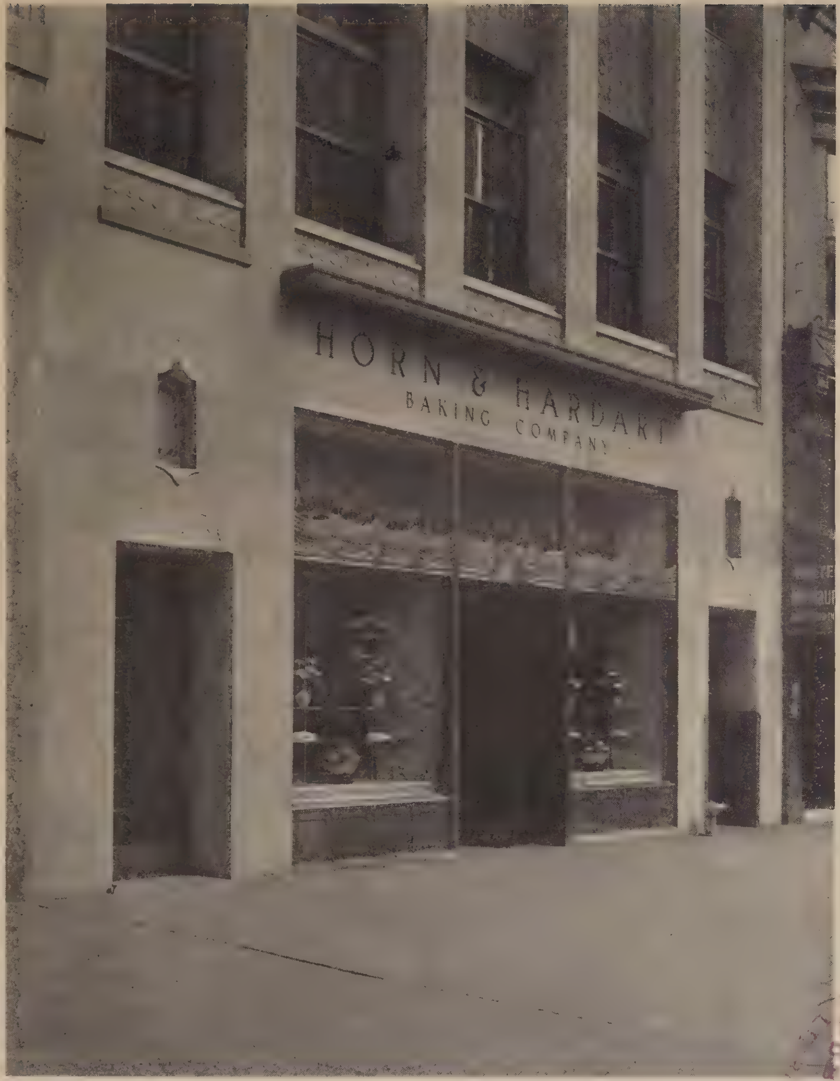


Photo. Joseph N. Pearce

HORN & HARDART BUILDING, PHILADELPHIA
RALPH B. BENCKER, ARCHITECT

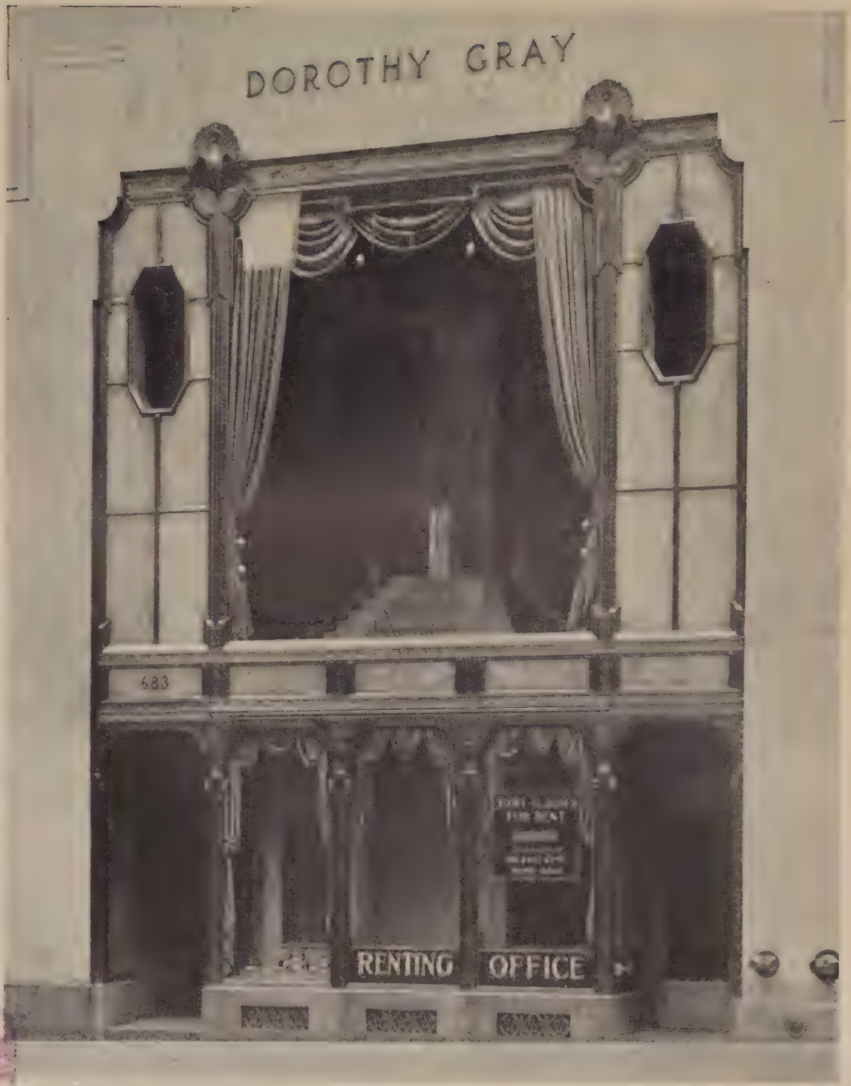


Photo. George H. Van Anda

DOROTHY GRAY SHOP, NEW YORK
KOHN & BUTLER, ARCHITECTS

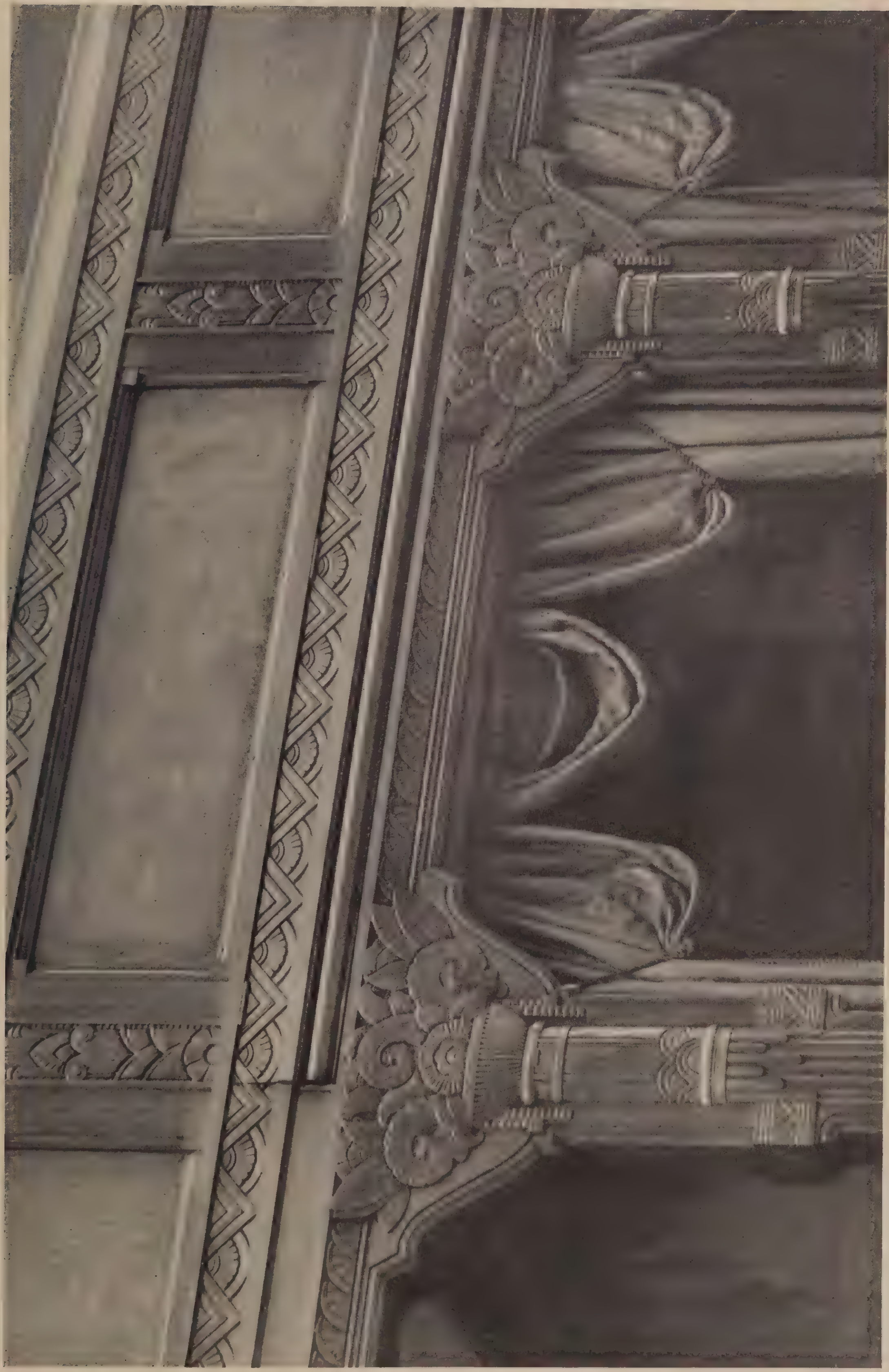
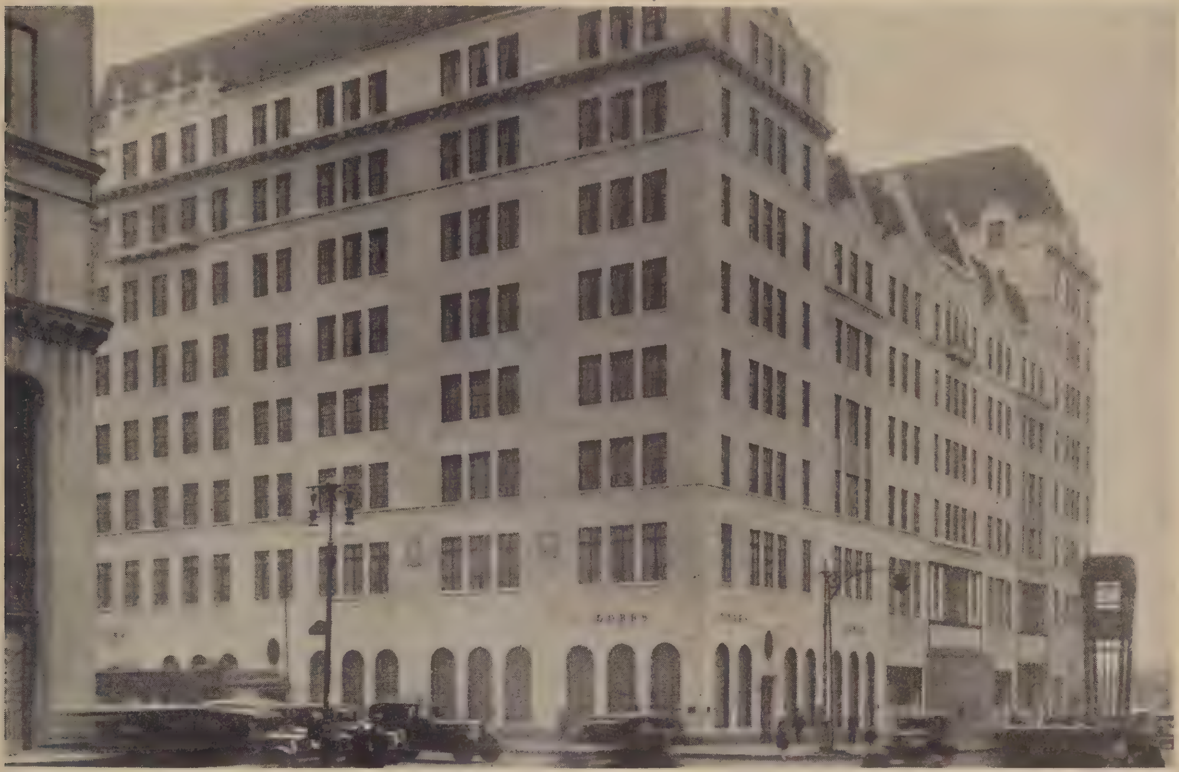
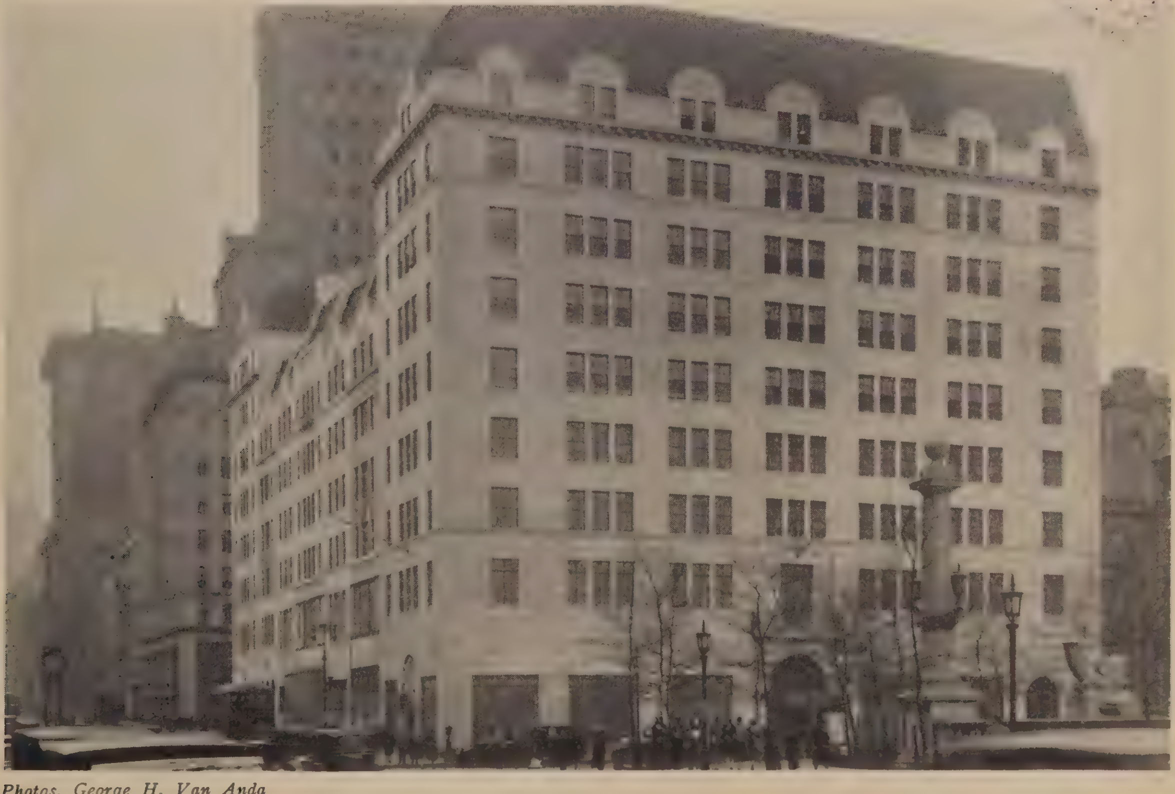


Photo. George H. Van Anda

DETAIL, DOROTHY GRAY SHOP, NEW YORK
KOHN & BUTLER, ARCHITECTS



VIEW FROM 57TH ST.

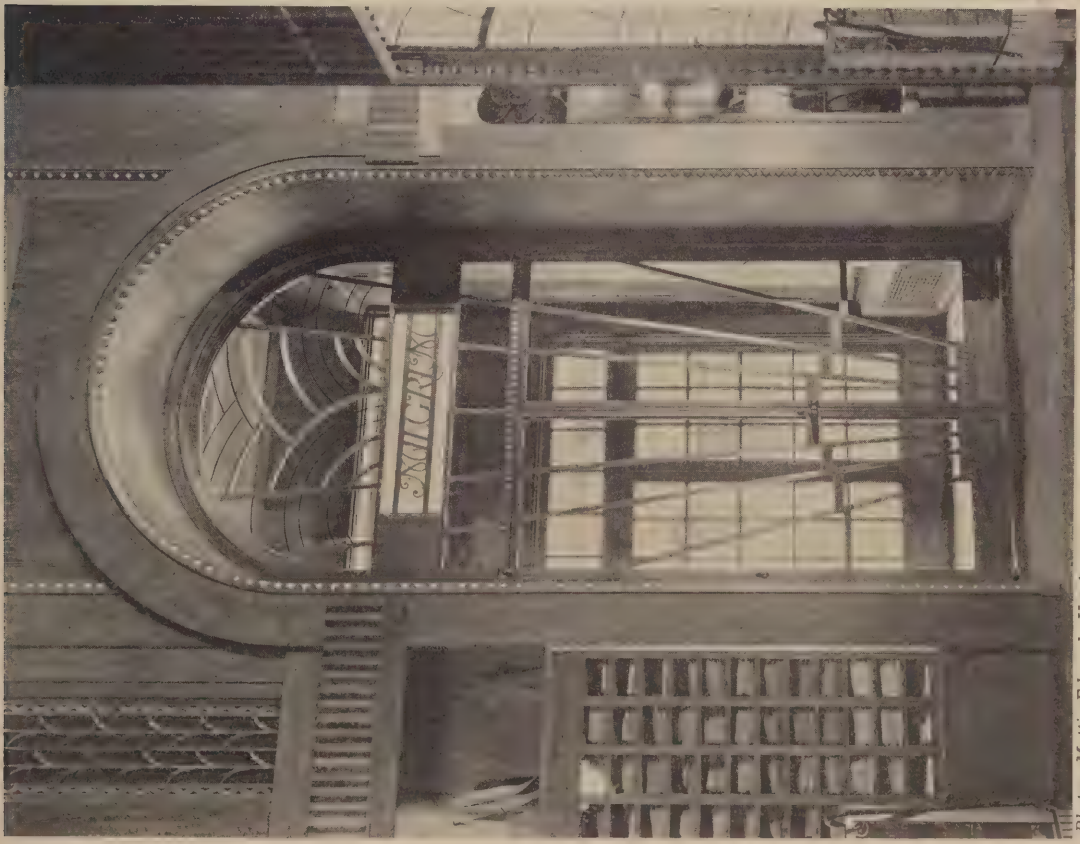


Photos. George H. Van Anda

VIEW FROM 58TH ST.

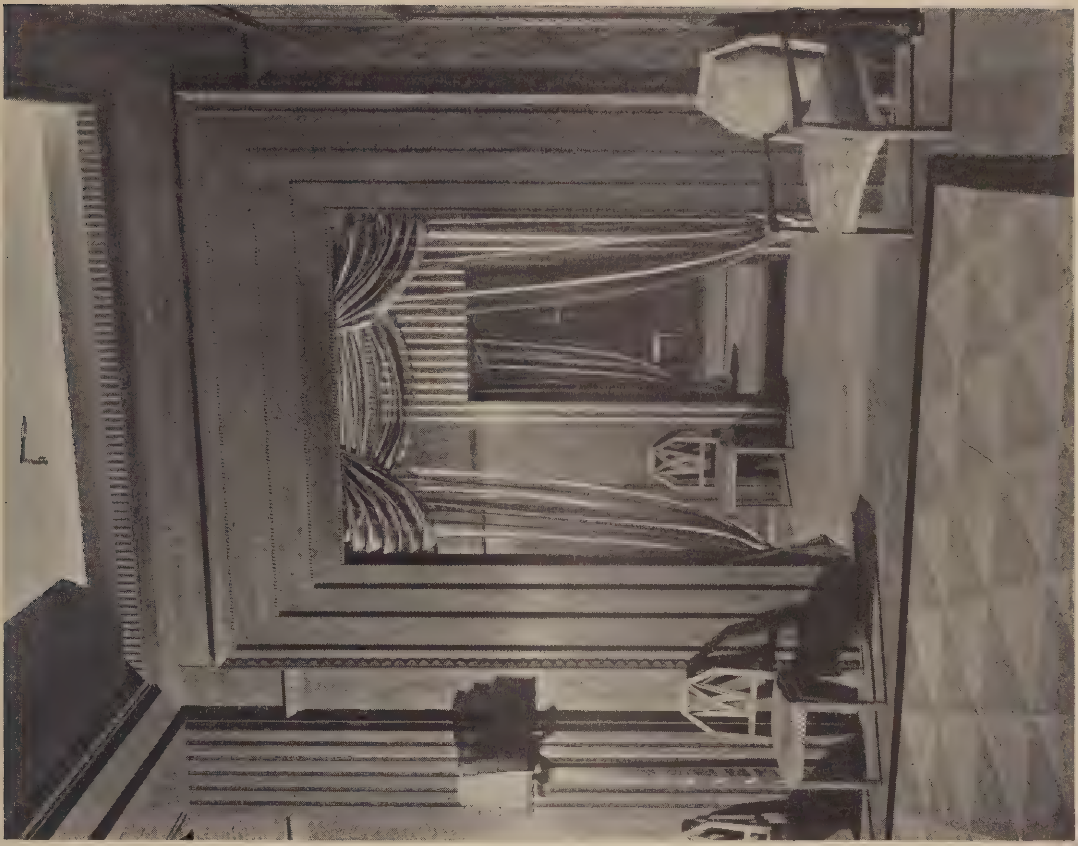
STORE BUILDING, FIFTH AVENUE, NEW YORK

BUCHMAN & KAHN, ARCHITECTS



Photos. Mattie Edwards Hewitt

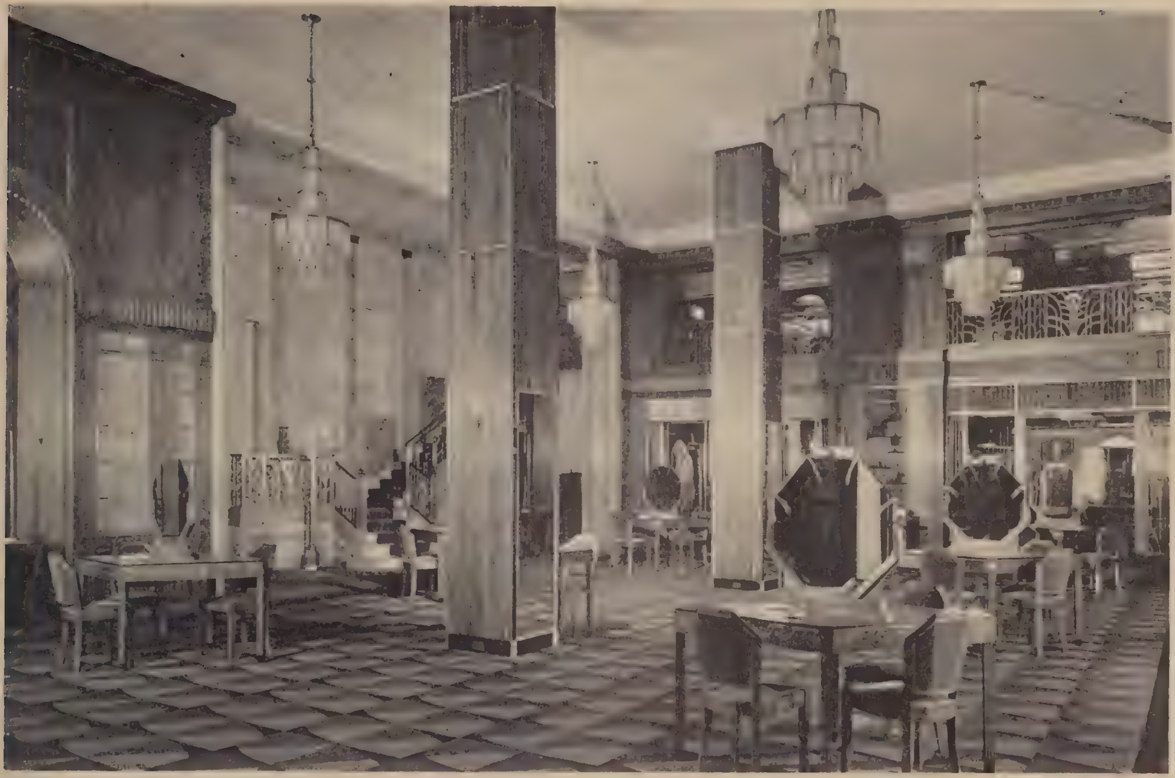
ENTRANCE DOOR



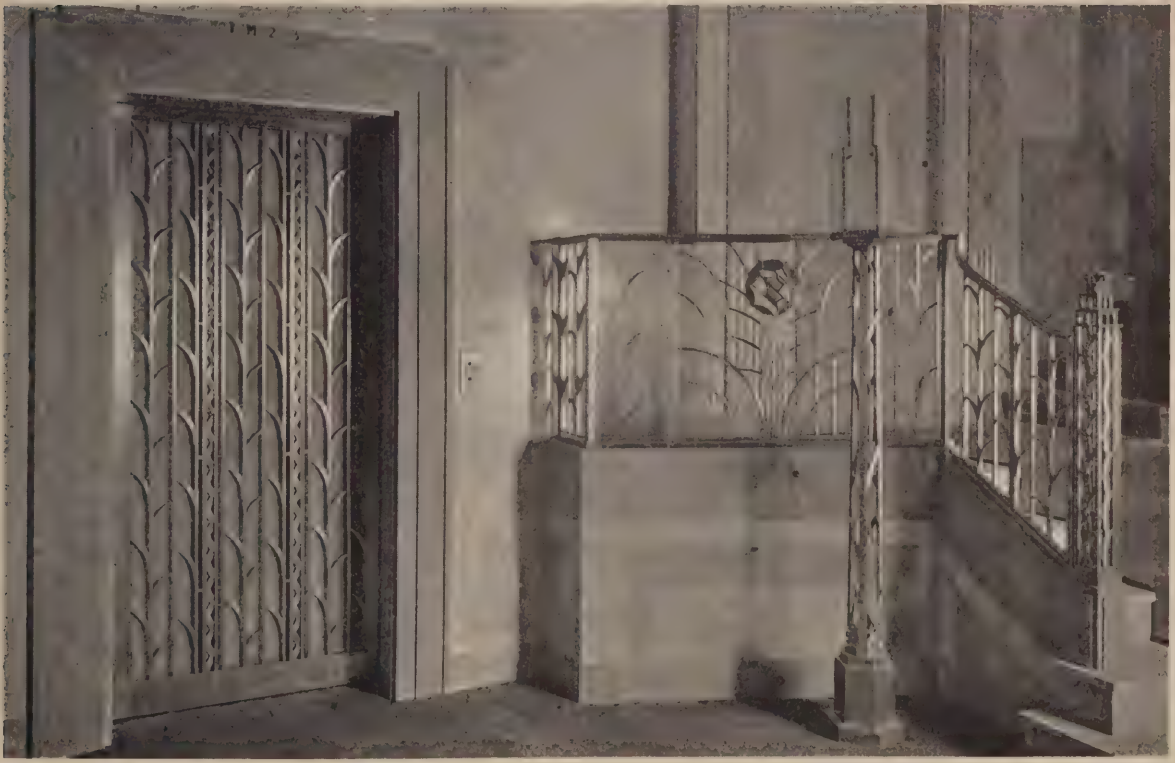
INTERIOR DOORWAY

THE MILGRIM SHOP, NEW YORK

FORZINA, INC., ARCHITECTS



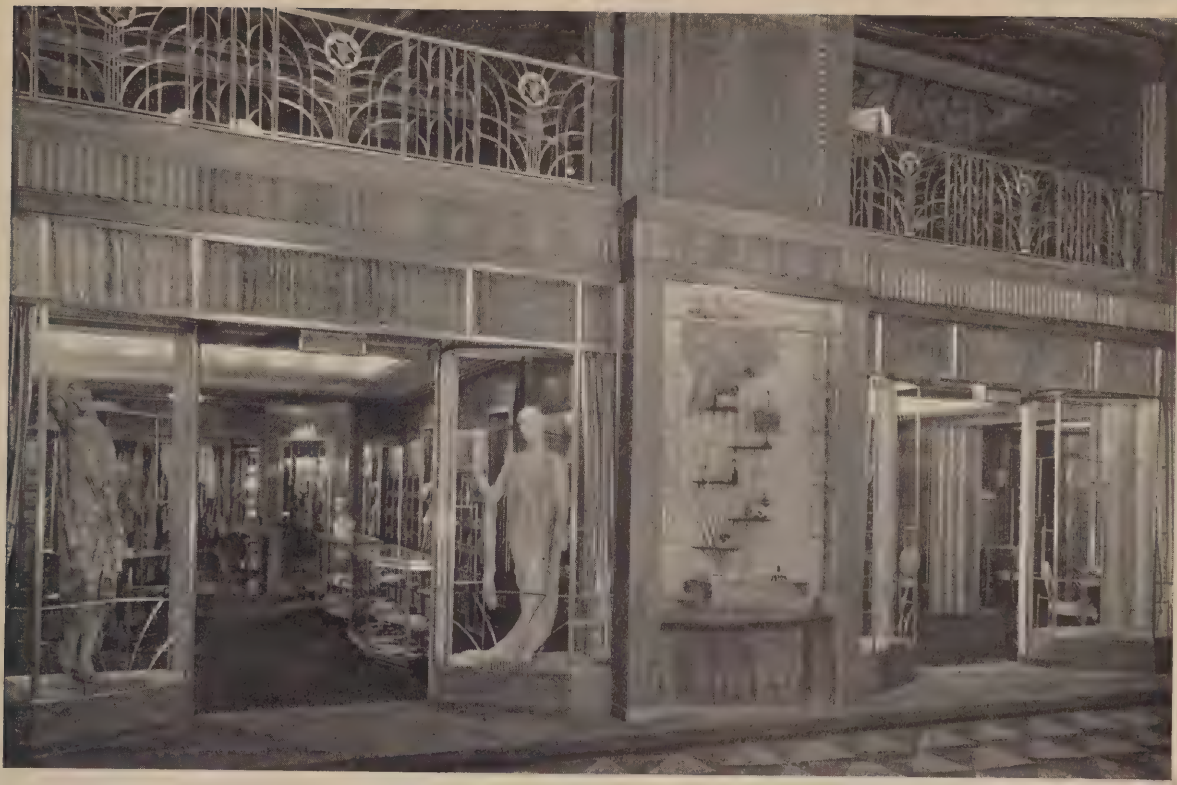
MAIN SALON



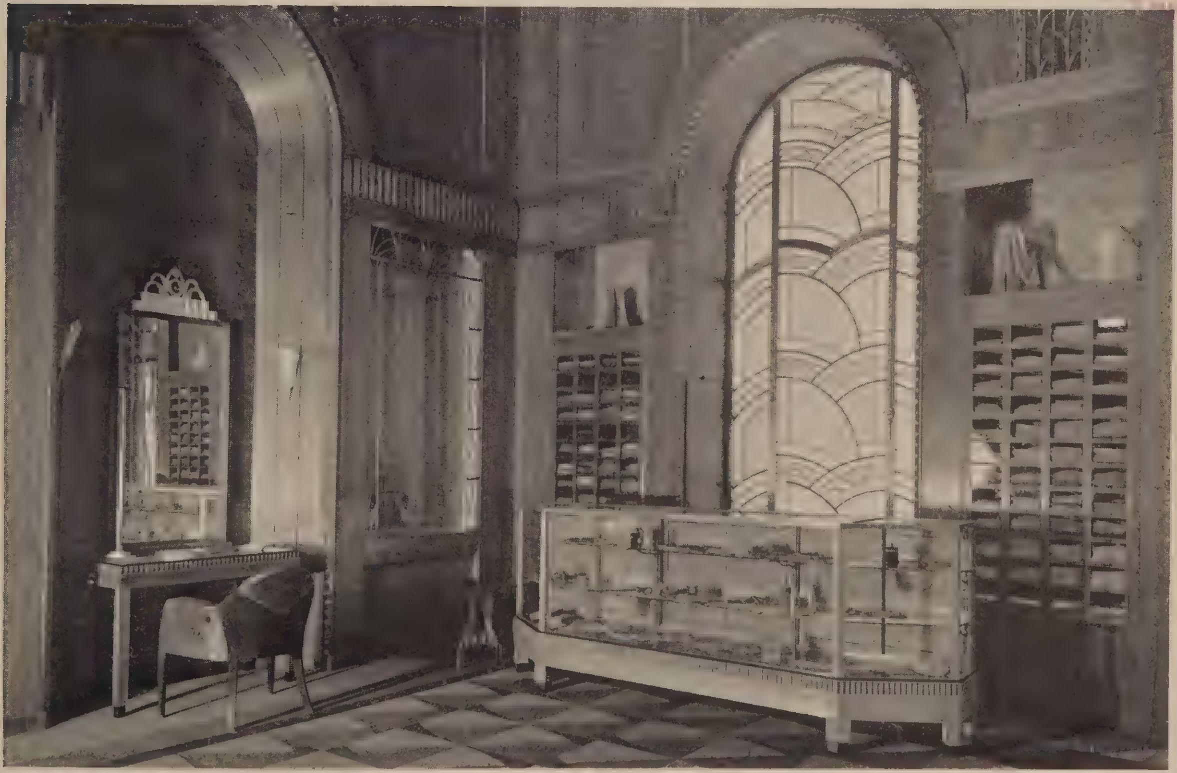
DETAIL, ELEVATOR DOOR AND STAIRWAY

MILGRIM SHOP, NEW YORK

FORZINA, INC., ARCHITECTS



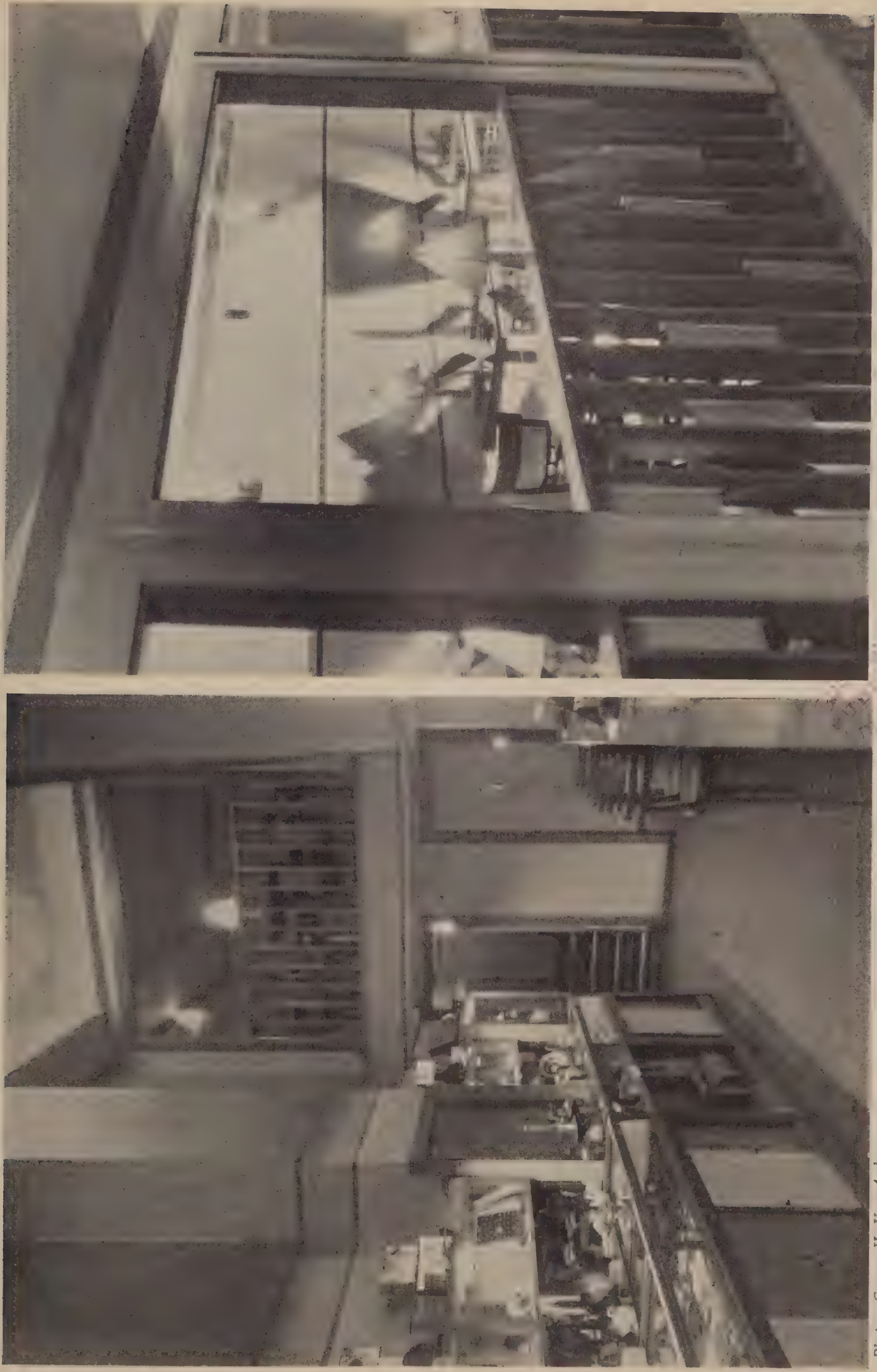
DETAIL, SIDE OF MAIN SALON



CORNER, MAIN SALON

THE MILGRIM SHOP, NEW YORK

FORZINA, INC., ARCHITECTS



Photos. George H. Van Anda

COLBEE CANDY SHOP, NEW YORK

WOLFGANG HOFFMANN & POLA HOFFMANN, INC., ARCHITECTS

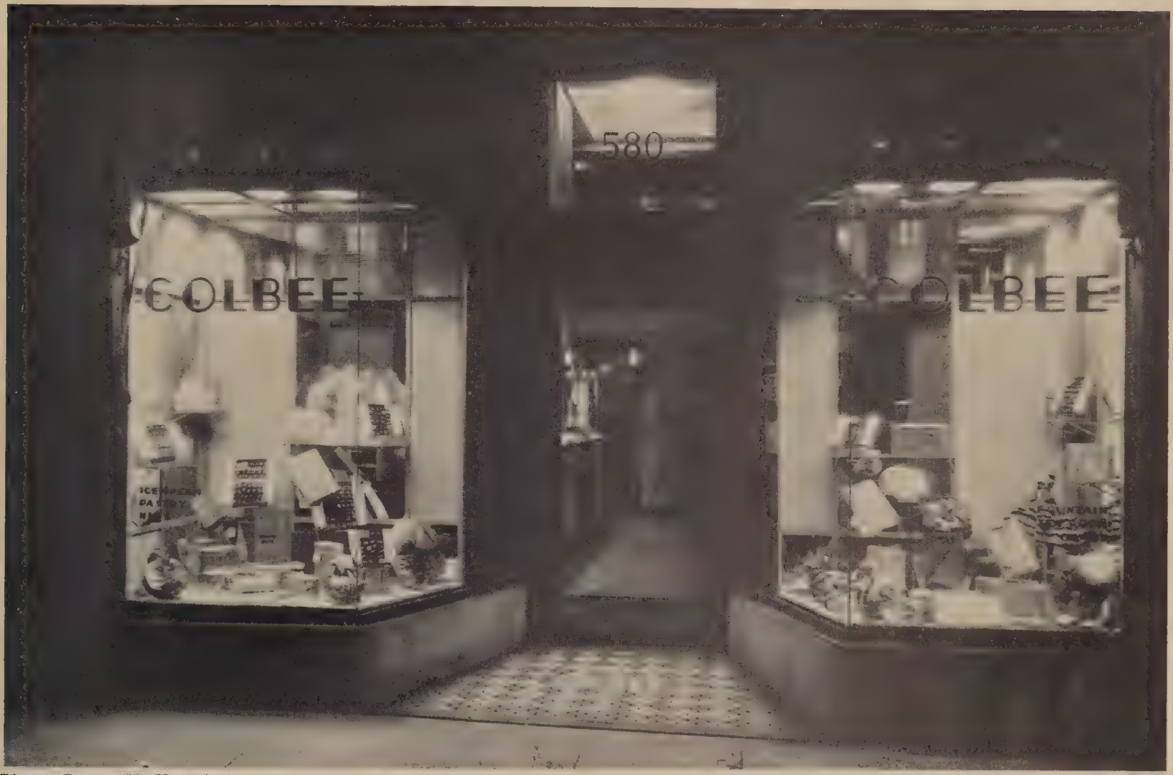
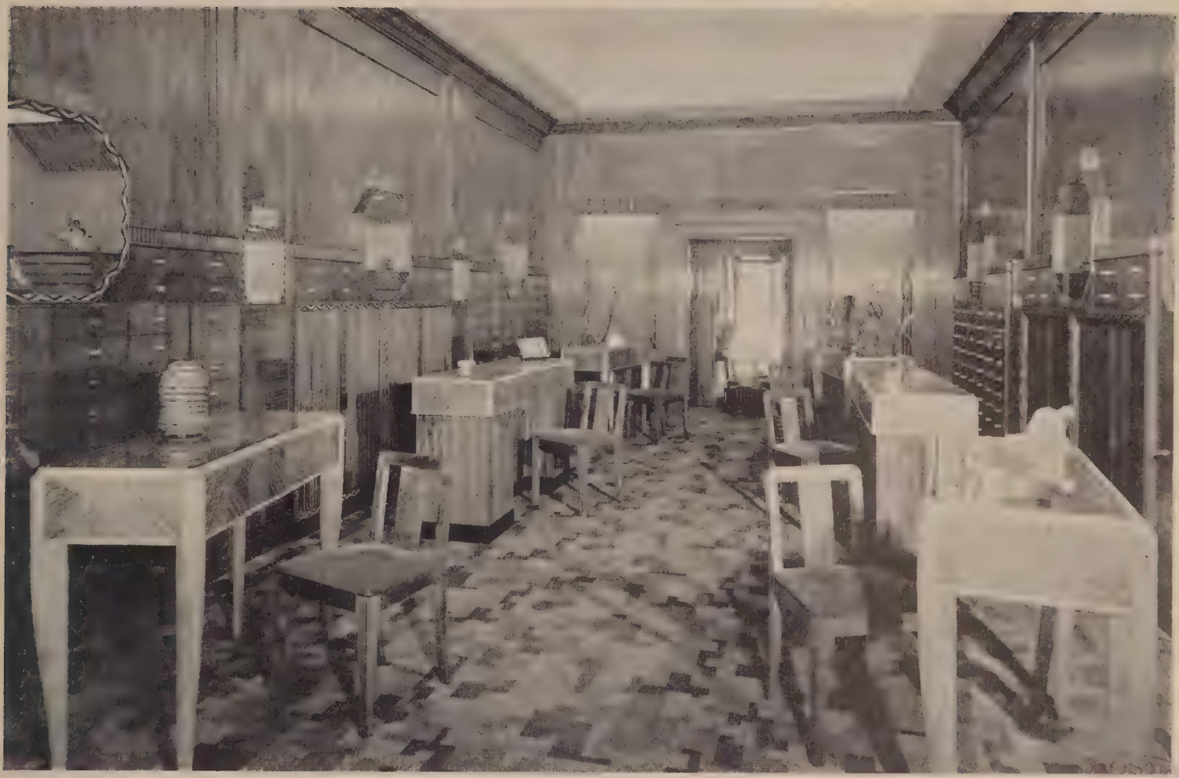


Photo. George H. Van Anda

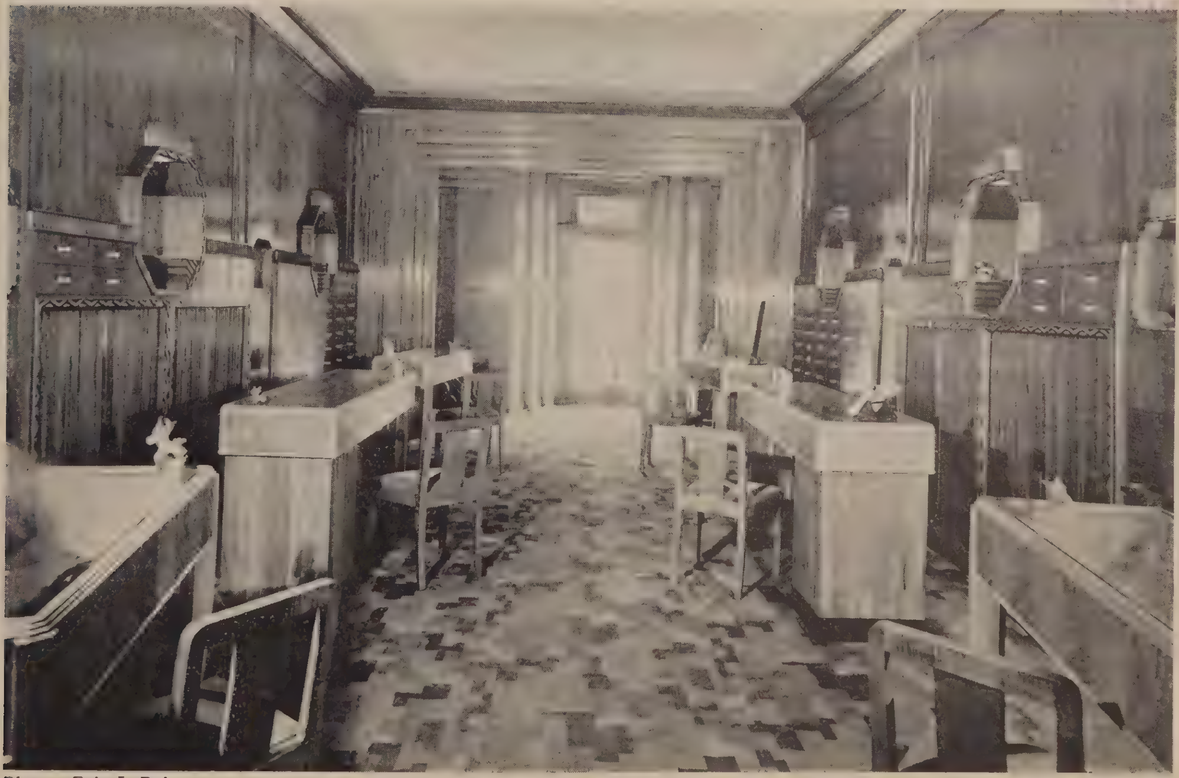
COLBEE CANDY SHOP, NEW YORK
WOLFGANG HOFFMANN & POLA HOFFMANN, INC., ARCHITECTS

Photos. Eric J. Baker

NAT LEWIS SHOP, NEW YORK
NAT LEWIS, DESIGNER



SHOP INTERIOR

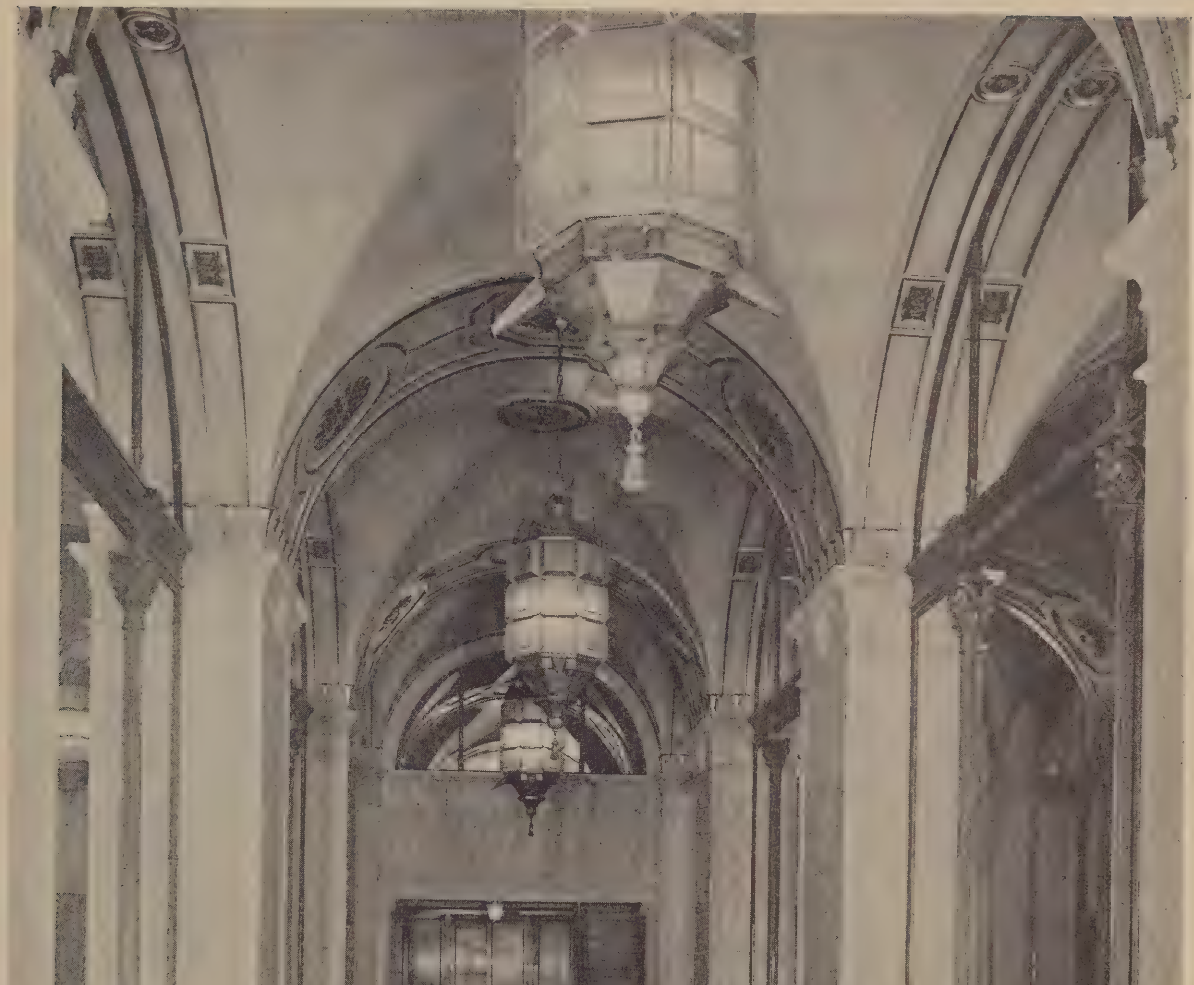


Photos. Eric J. Baker

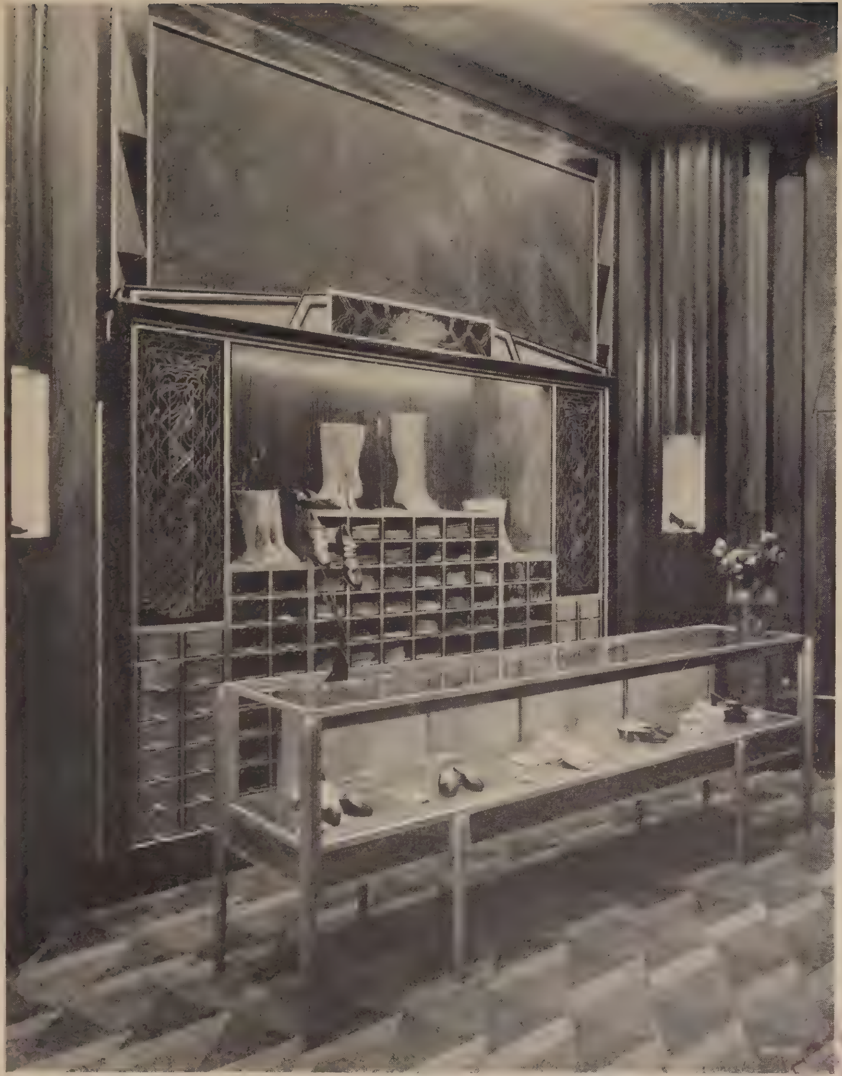
ENTRANCE END

NAT LEWIS SHOP, NEW YORK

NAT LEWIS, DESIGNER

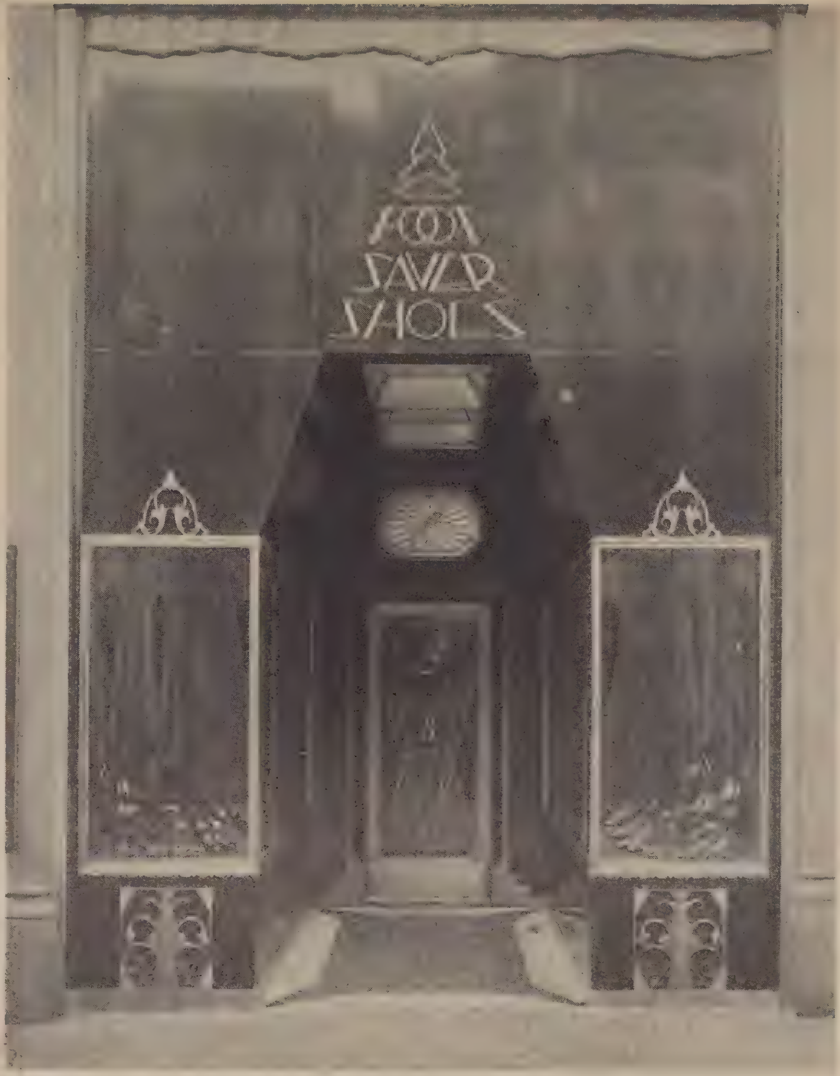


REMINGTON TYPEWRITER SHOP, NEW YORK
GOODWILLIE & MORAN, ARCHITECTS



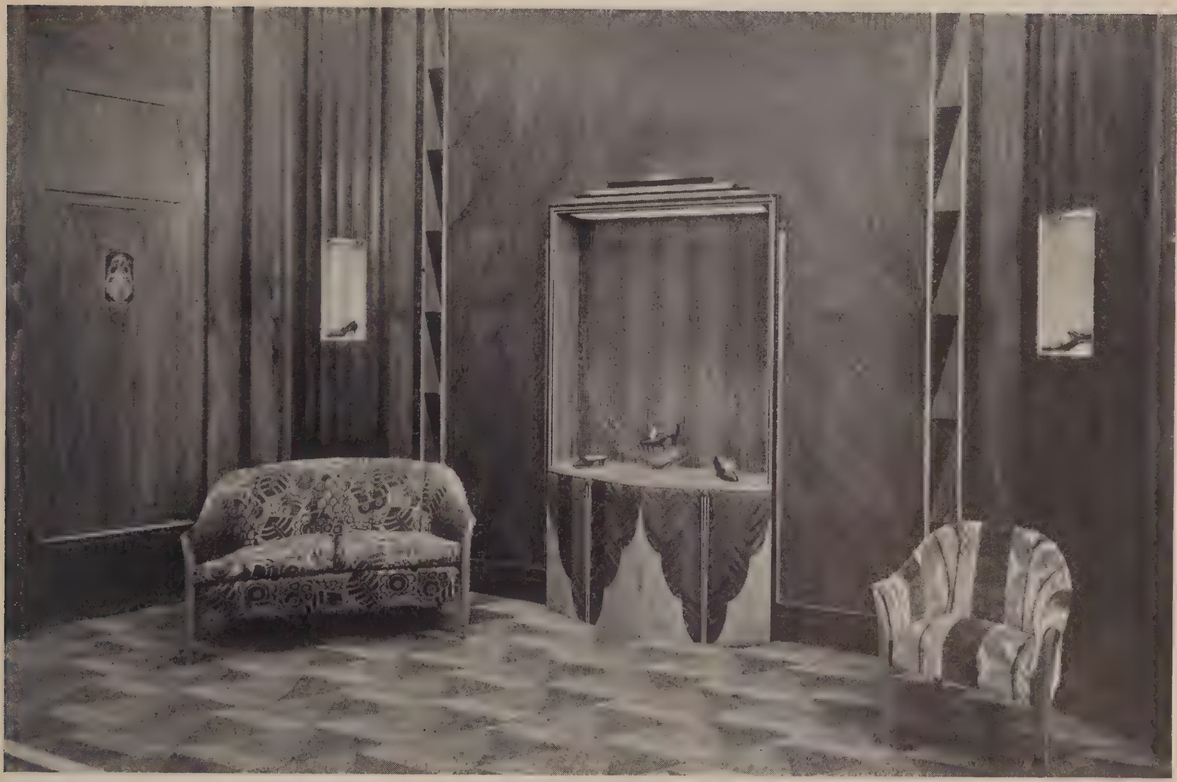
Photos. Howard Cox

AN INTERIOR

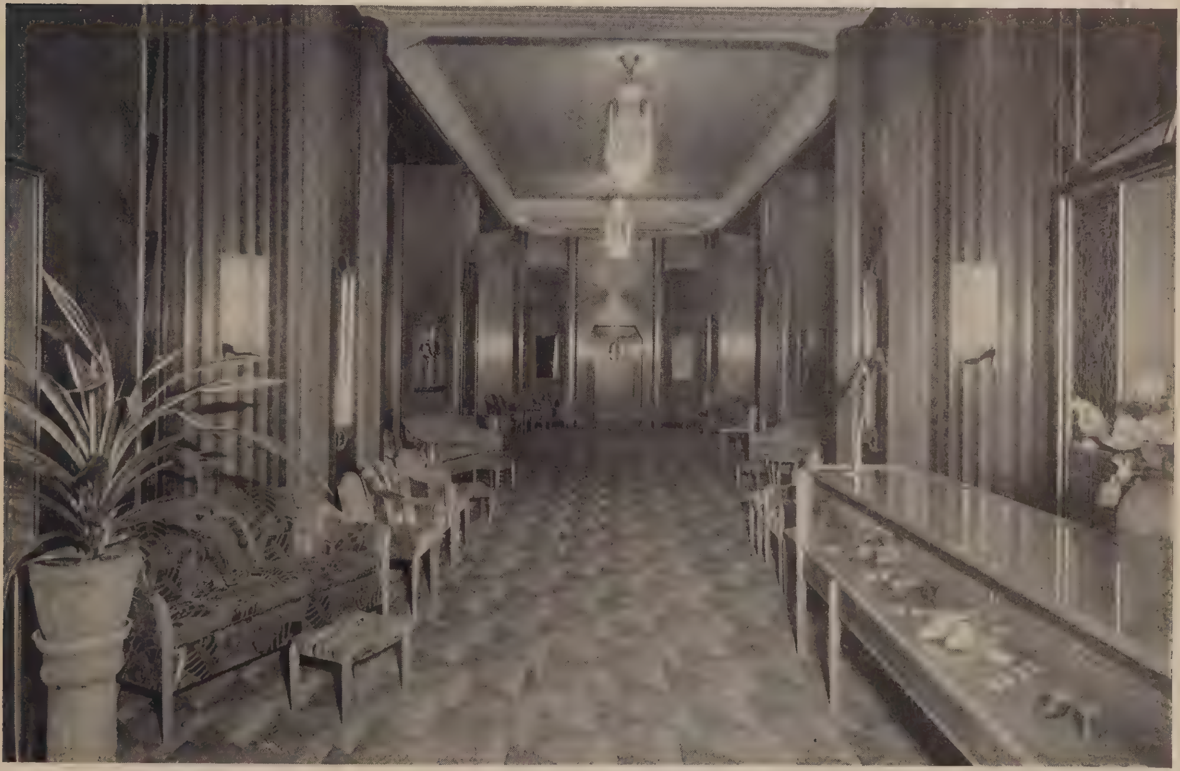


ENTRANCE FRONT

FOOT SAVER SHOE SHOP, NEW YORK
S. S. SILVER & CO., DESIGNERS



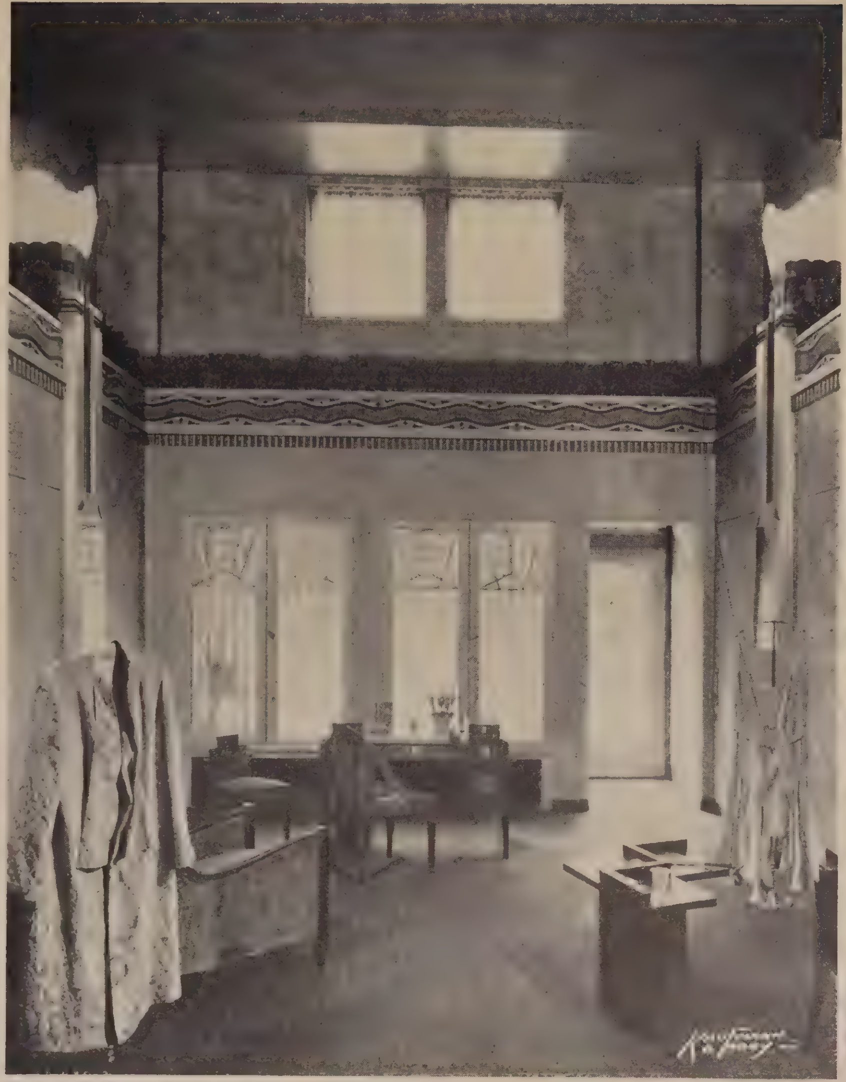
AN INTERIOR



GENERAL VIEW

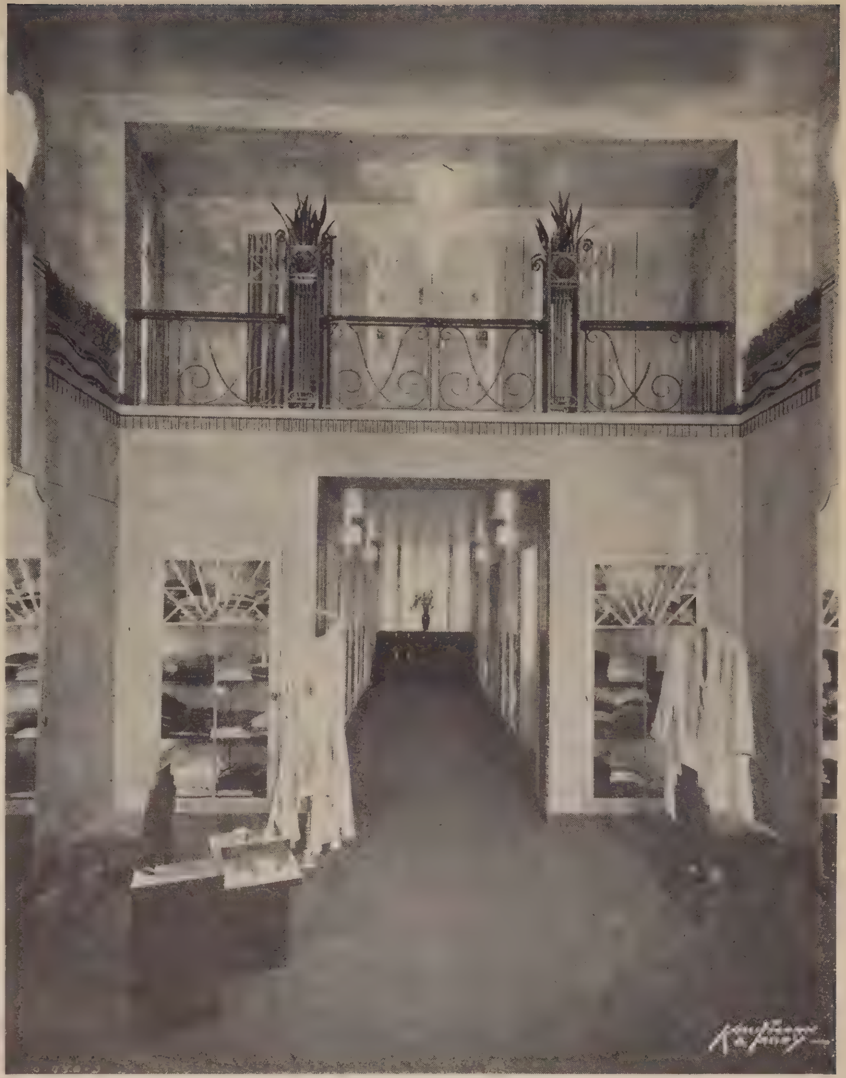
FOOT SAVER SHOE SHOP, NEW YORK

S. S. SILVER & CO., DESIGNERS



Photos. Kaufmann & Fabry

STREET END

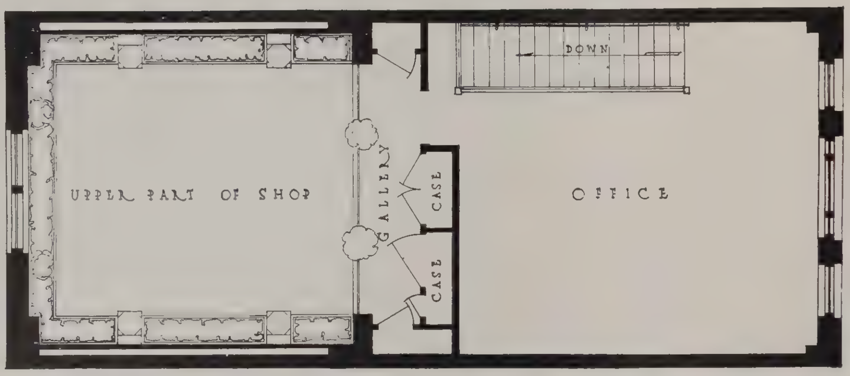


Plans on Back

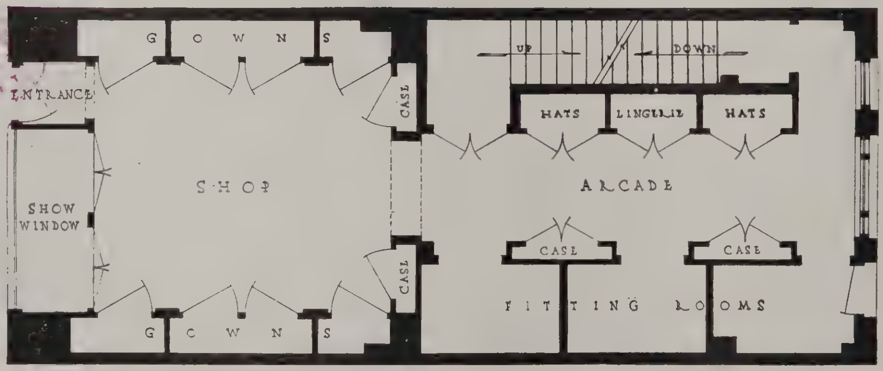
AN INTERIOR

SHOP FOR MRS. FRANKLIN, INC., CHICAGO

TILDEN, REGISTER & PEPPER, ARCHITECTS. WALCOTT & WORK, ASSOCIATE ARCHITECTS



MEZZANINE FLOOR



STREET FLOOR

PLANS. SHOP FOR MRS. FRANKLIN, INC., CHICAGO
TILDEN, REGISTER & PEPPER, ARCHITECTS. WALCOTT & WORK, ASSOCIATE ARCHITECTS

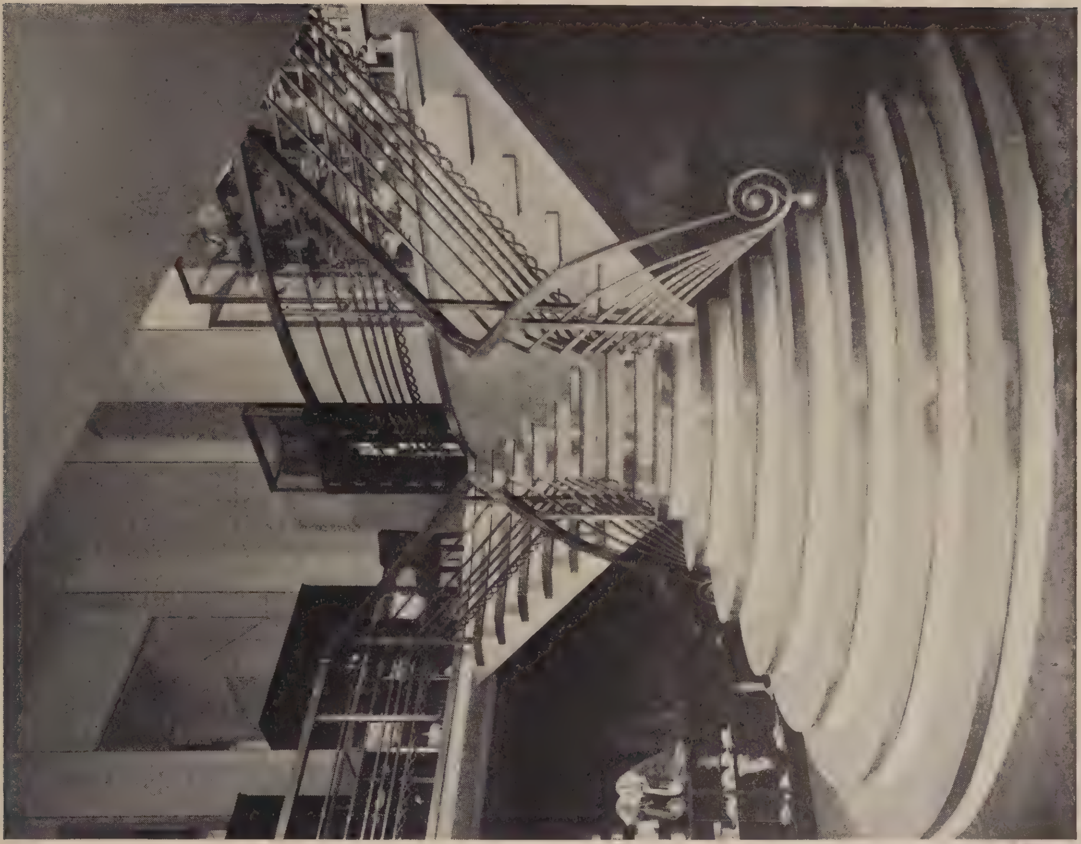


Photo. Bonney

LA PETITE JEANNETTE, PARIS
PATOUT, DESIGNER

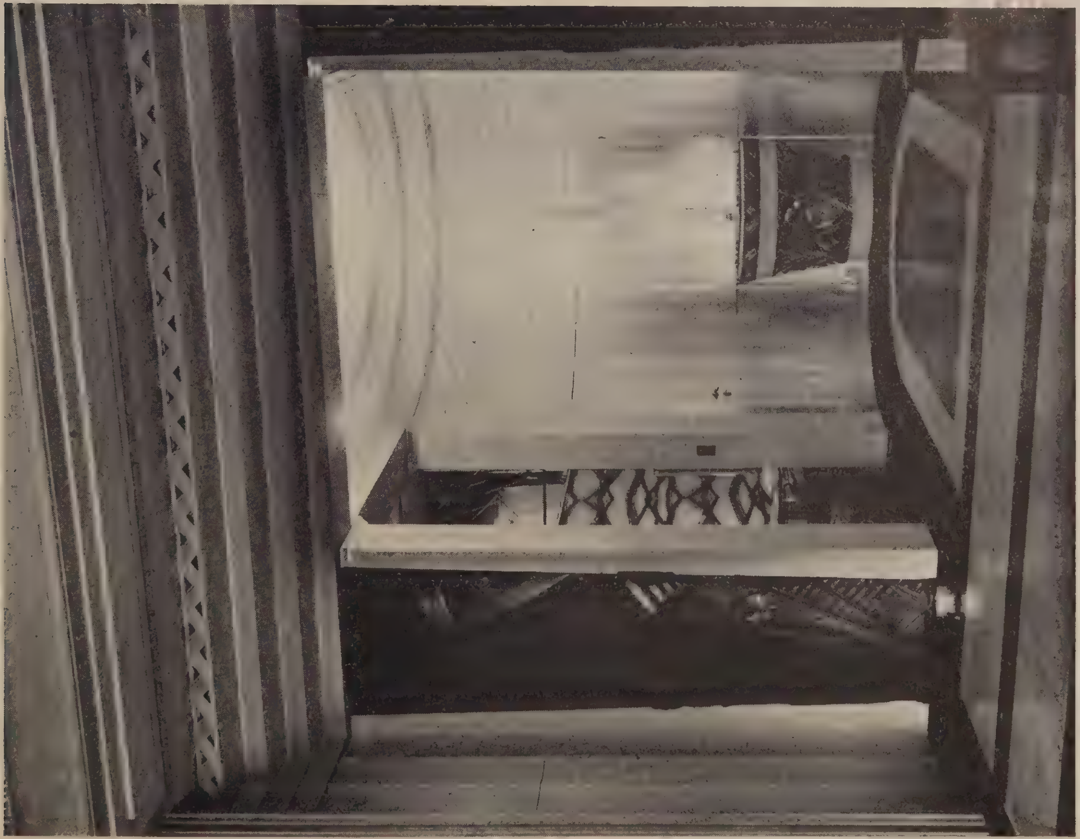


Photo. Andrew Deane

LENTHERIC SHOP, NEW YORK
PAUL CHALFIN, ARCHITECT

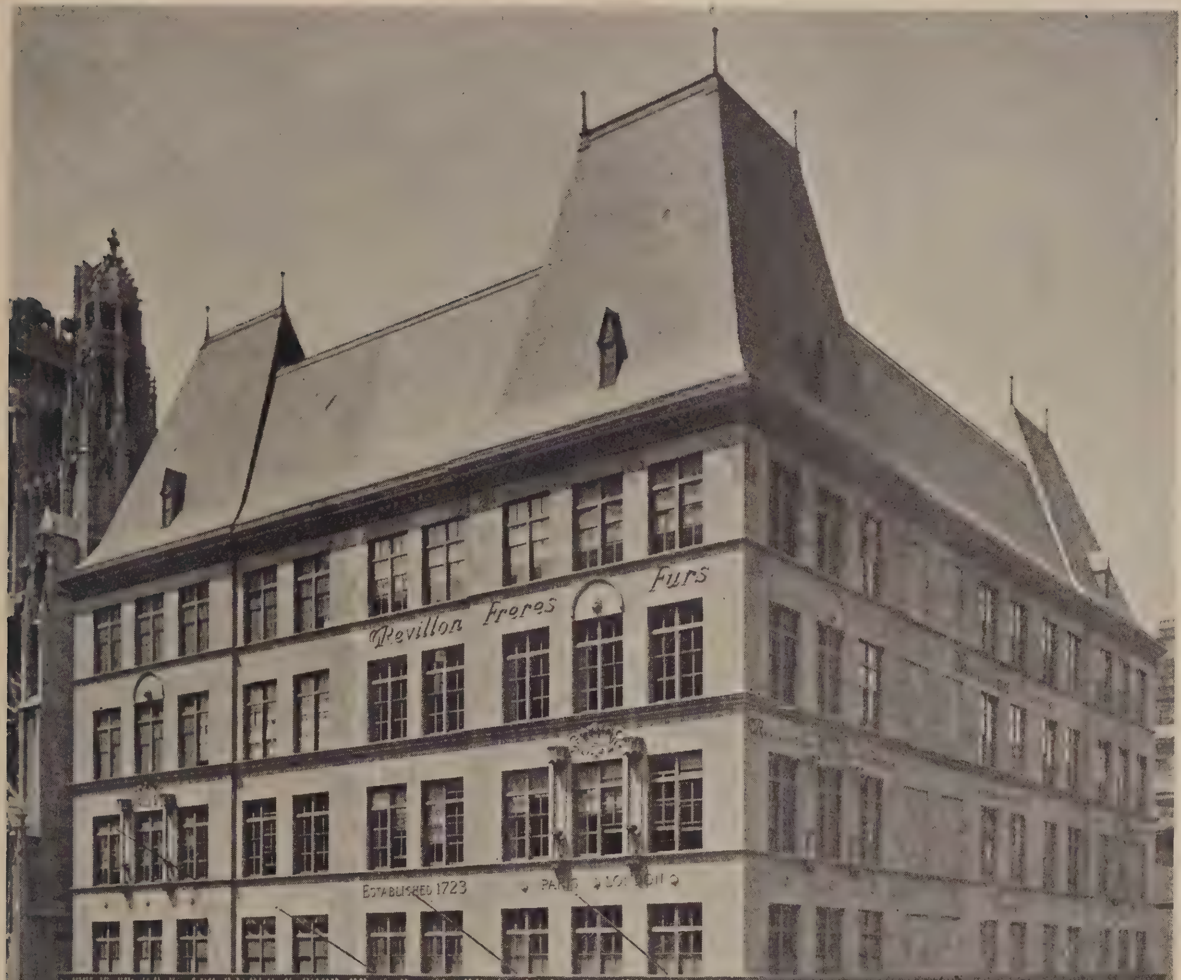
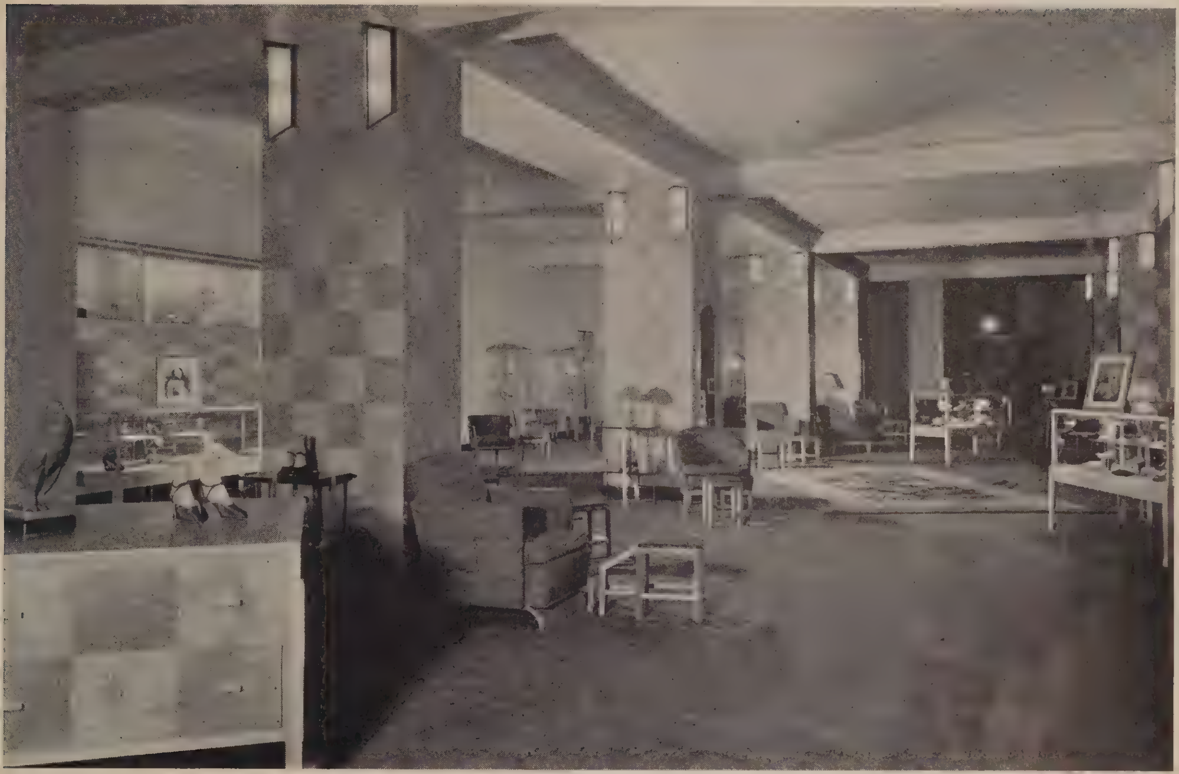
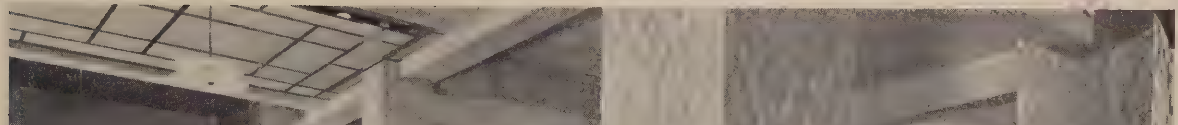


Photo. Drix Duryea

SHOP FOR REVILLON FRERES, NEW YORK
HENRY C. PELTON, ARCHITECTS



MAIN FLOOR

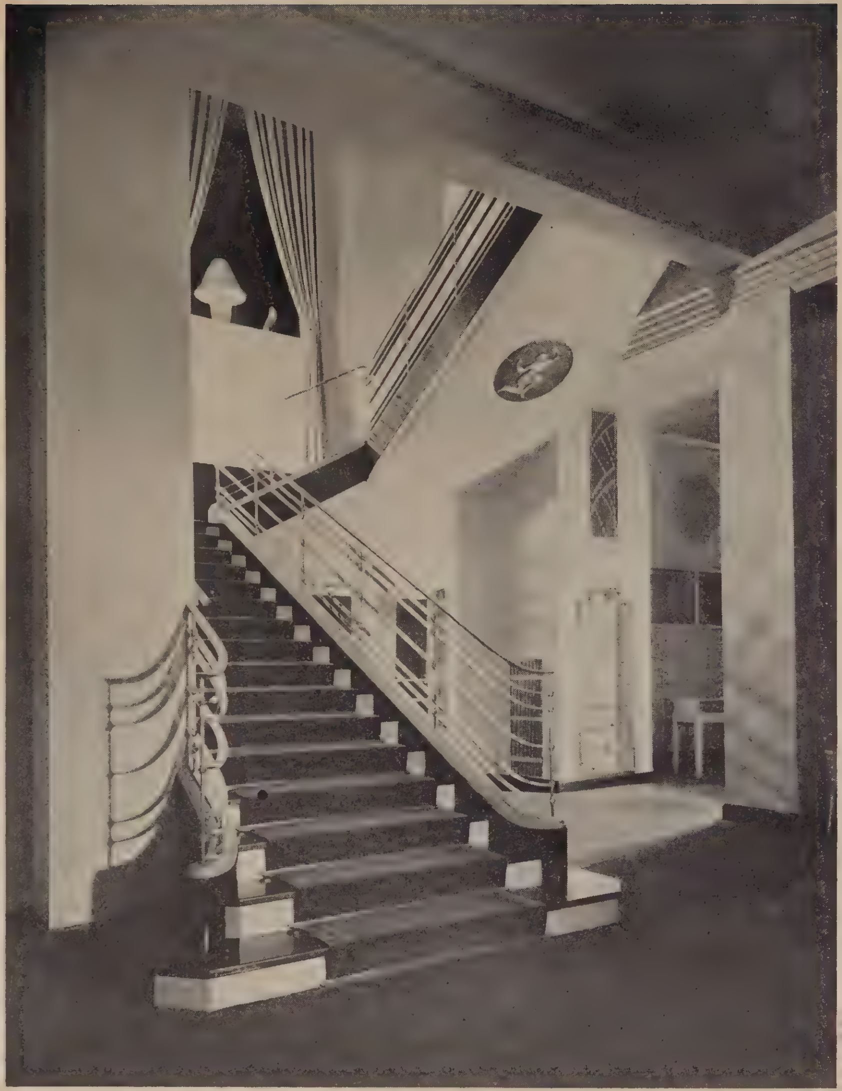


Photos. Moffett Studios

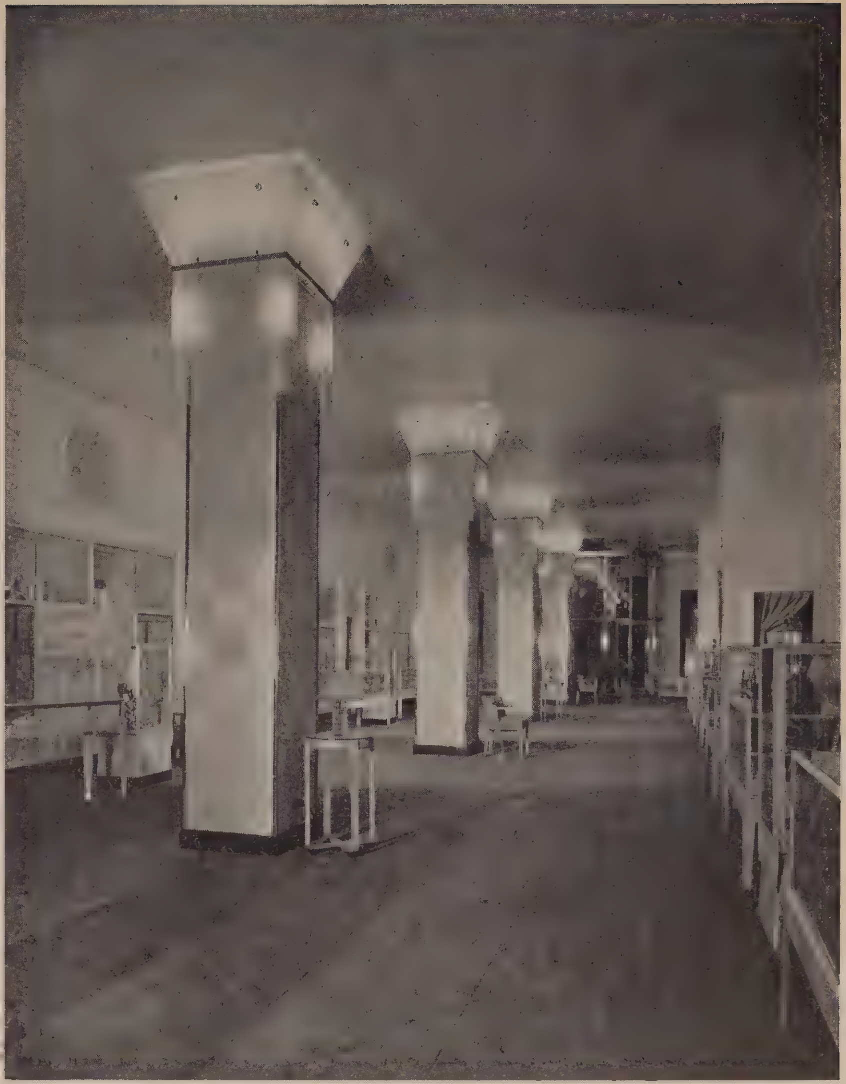
MILLINERY DEPARTMENT

SAKS-FIFTH AVENUE STORE, CHICAGO

HOLABIRD & ROOT, ARCHITECTS

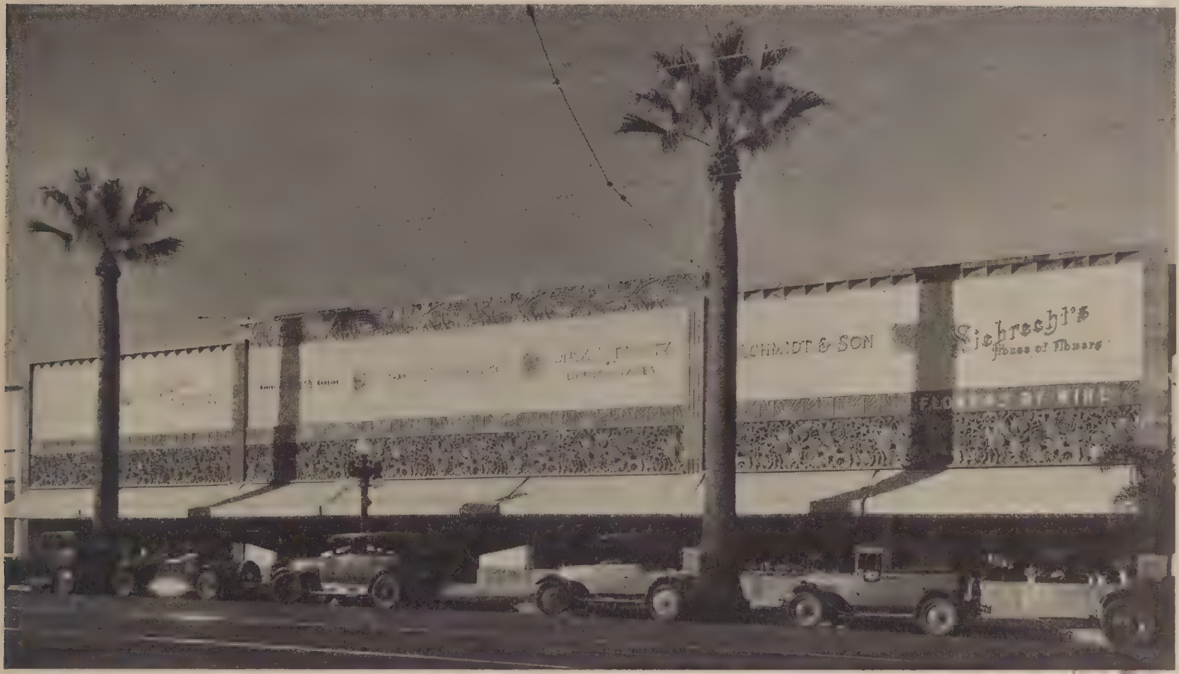


MAIN STAIRWAY



LOWER FLOOR

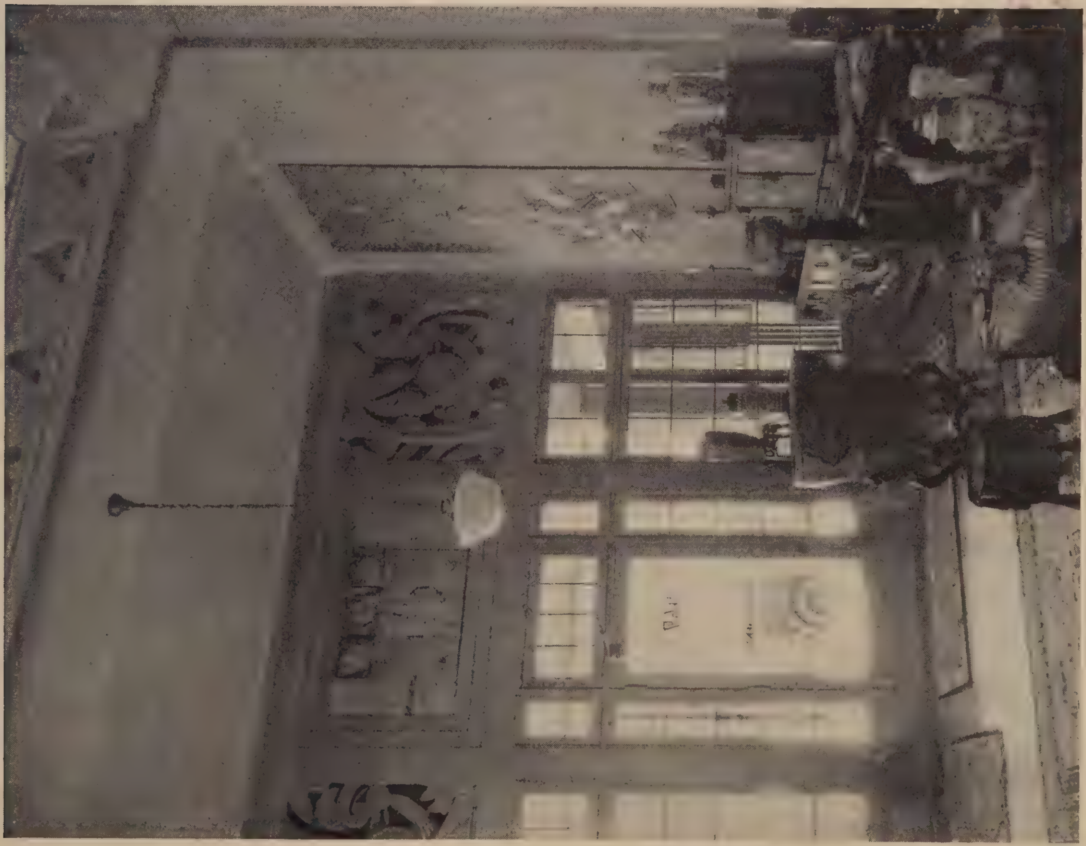
SAKS-FIFTH AVENUE STORE, CHICAGO
HOLABIRD & ROOT, ARCHITECTS



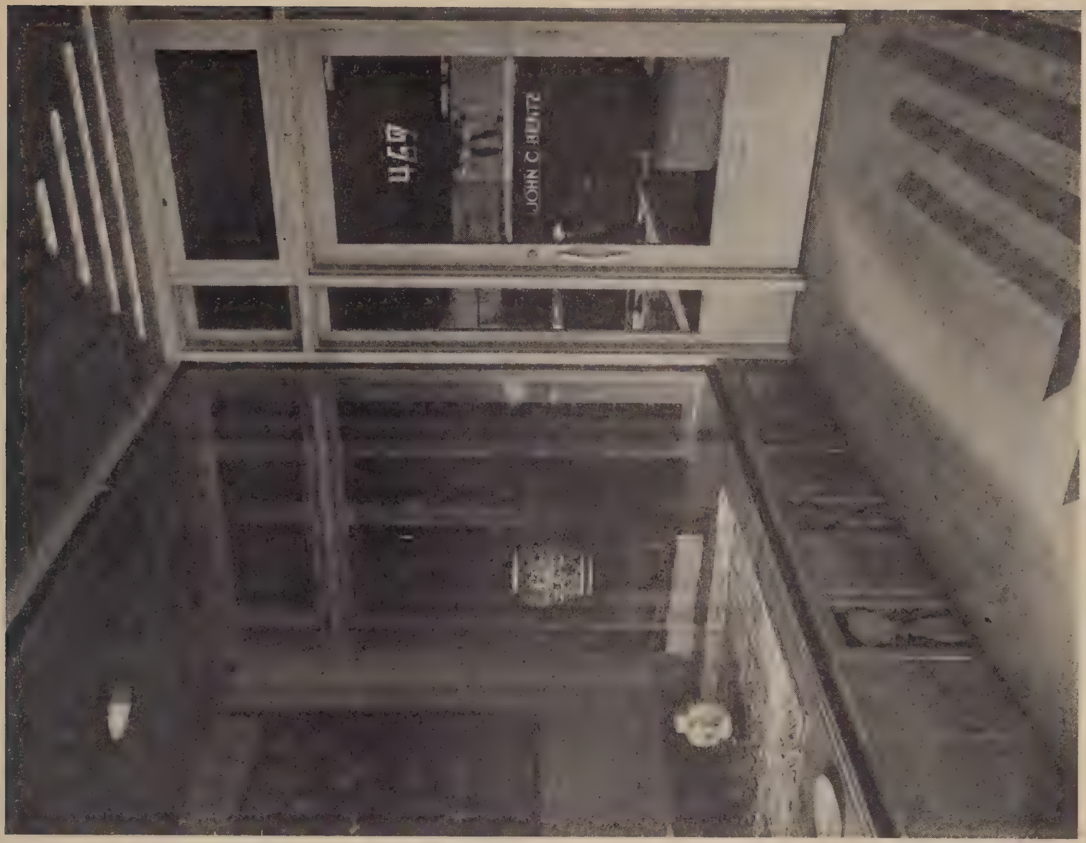
WARNER STORE BUILDING, PASADENA
MARSTON & MAYBURY, ARCHITECTS

Photos. George Haight

WILLIAM WILSON COMPANY BUILDING, PASADENA
MARSTON, VAN PELT & MAYBURY, ARCHITECTS



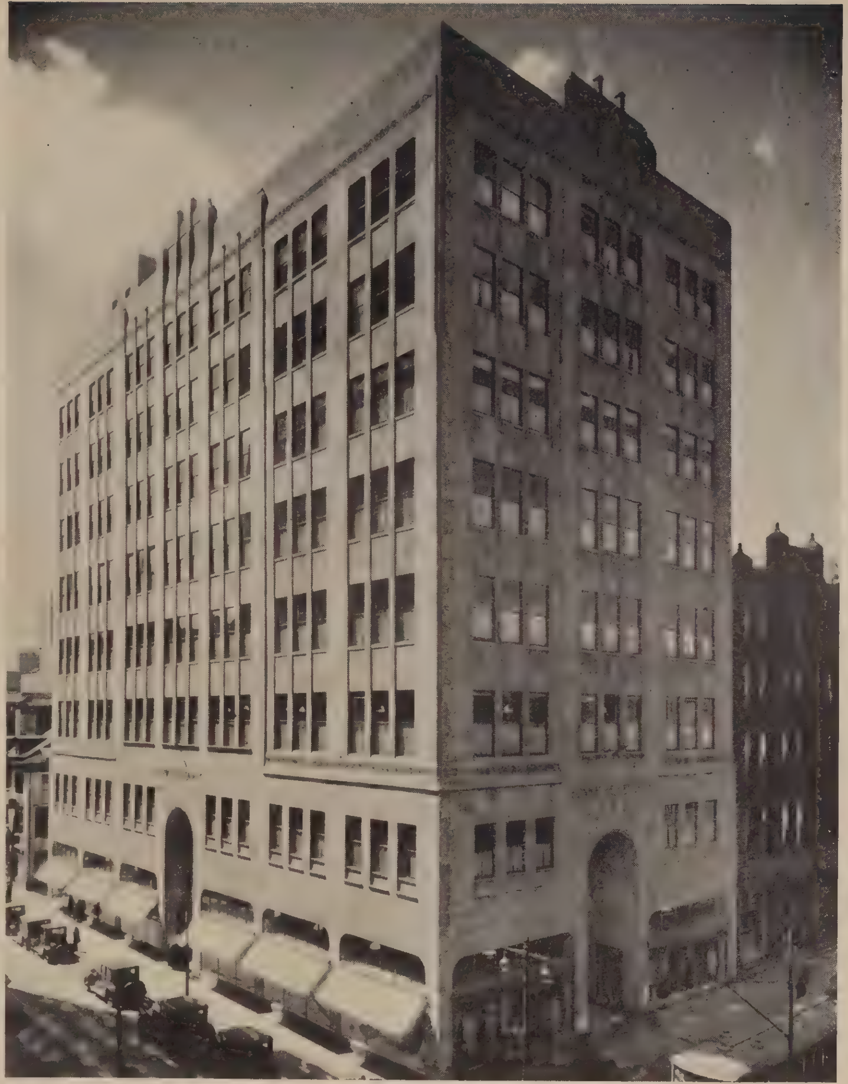
AN INTERIOR



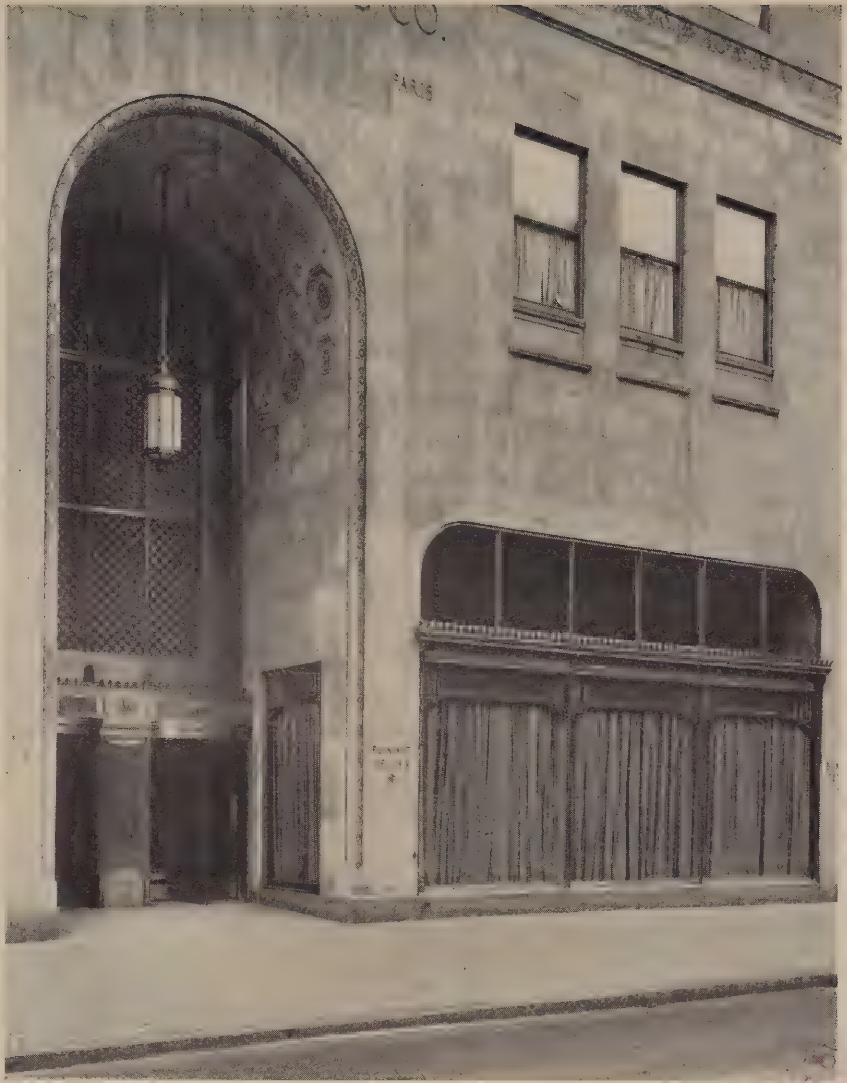
ENTRANCE TO SHOP

WARNER STORE BUILDING, PASADENA

MARSTON & MAYBURY, ARCHITECTS



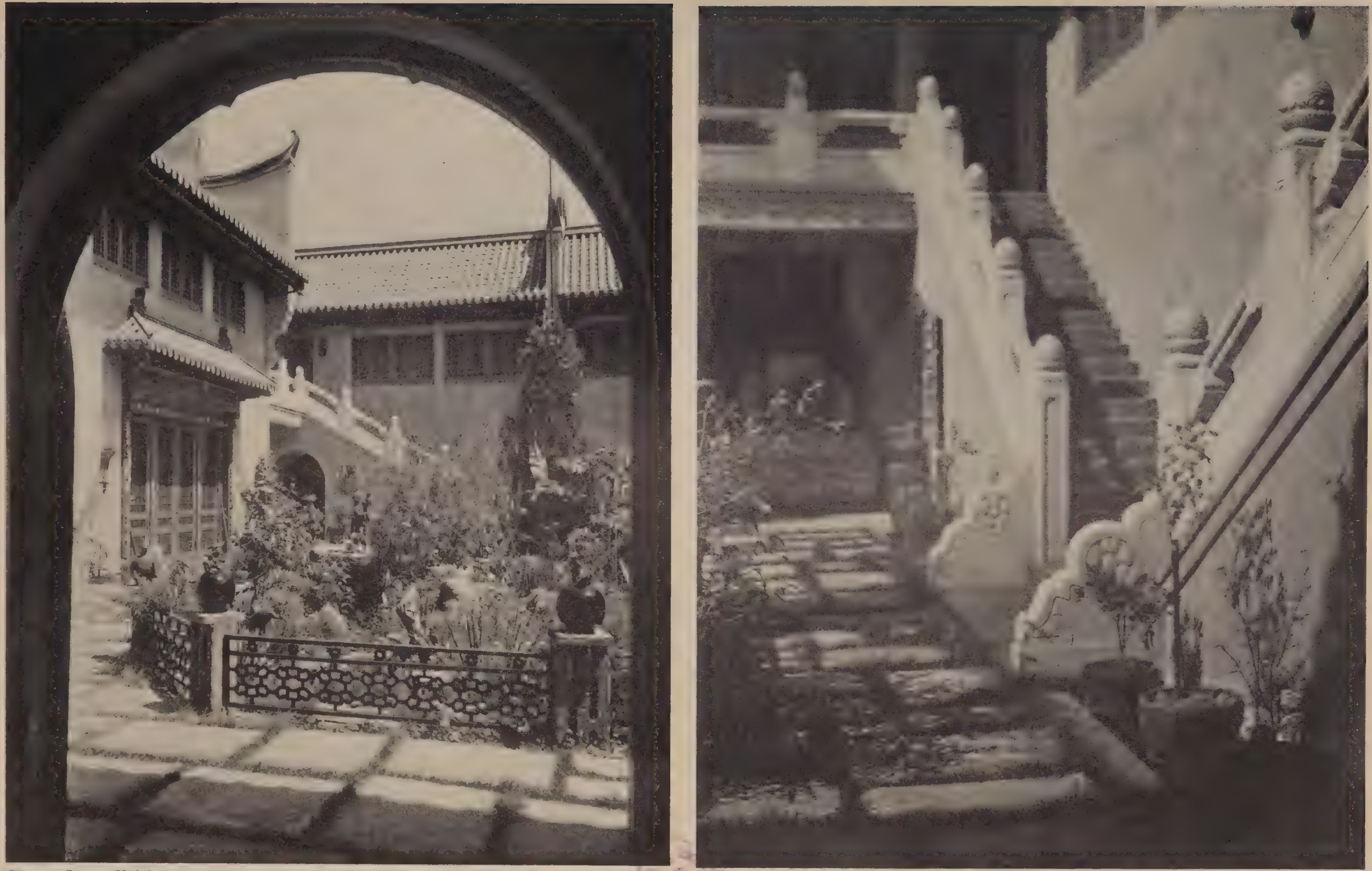
GENERAL VIEW



MAIN ENTRANCE

BONWIT TELLER STORE BUILDING, PHILADELPHIA

CLARENCE E. WUNDER, ARCHITECT



Photos. George Haight

INTERIOR COURTYARD

DETAIL OF STAIRWAY

GRACE NICHOLSON STUDIO BUILDING, PASADENA

MARSTON, VAN PELT & MAYBURY, ARCHITECTS

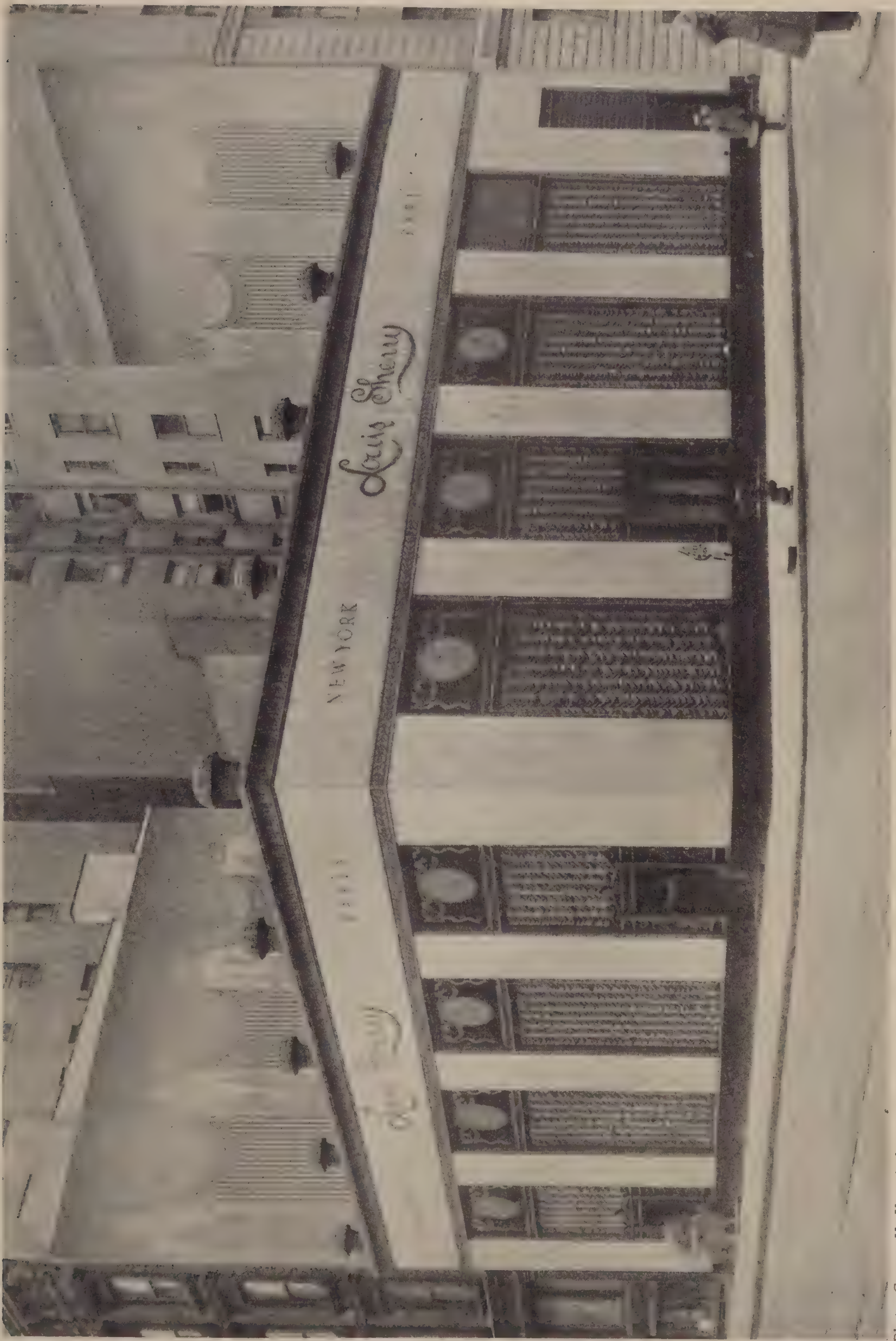
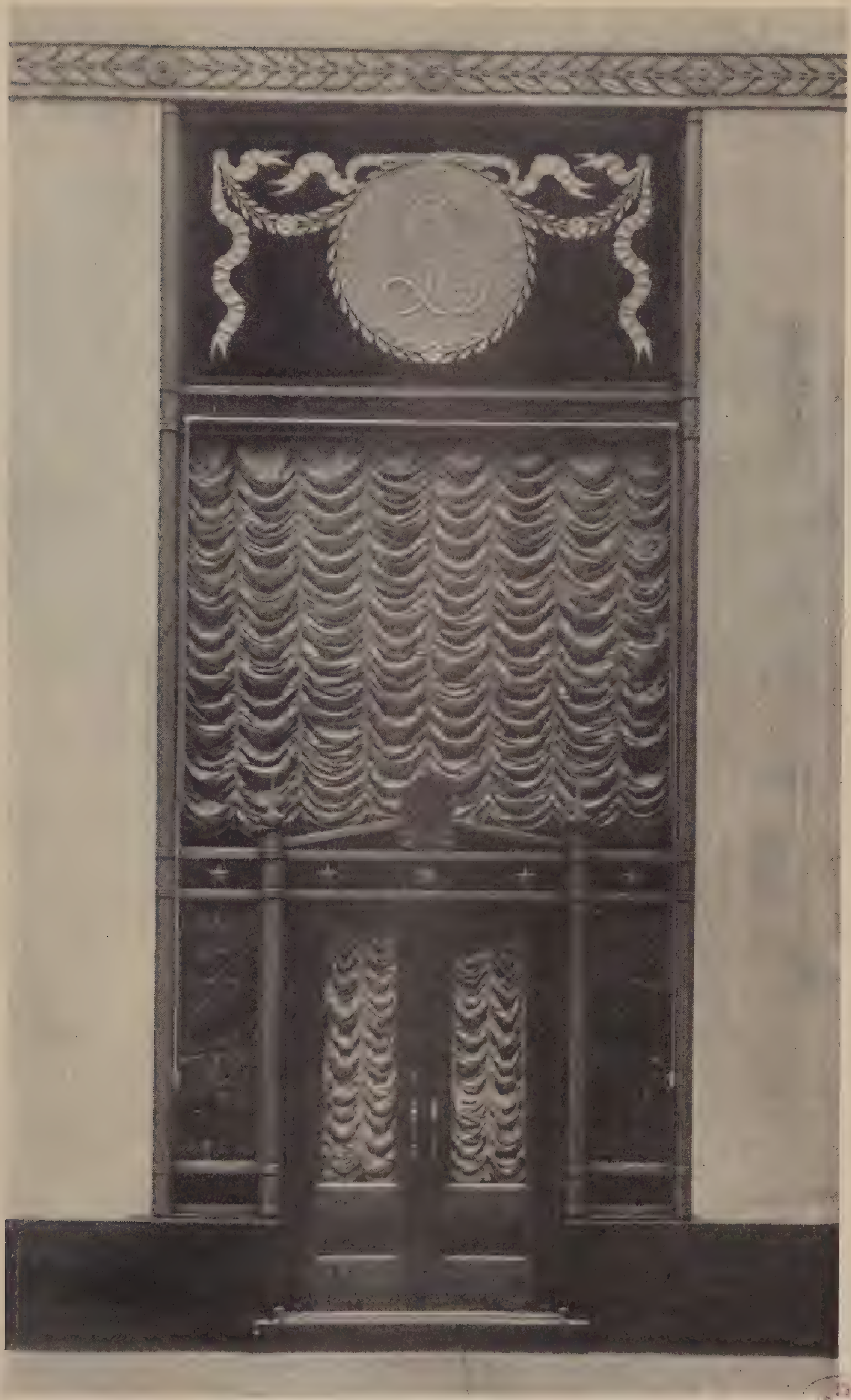
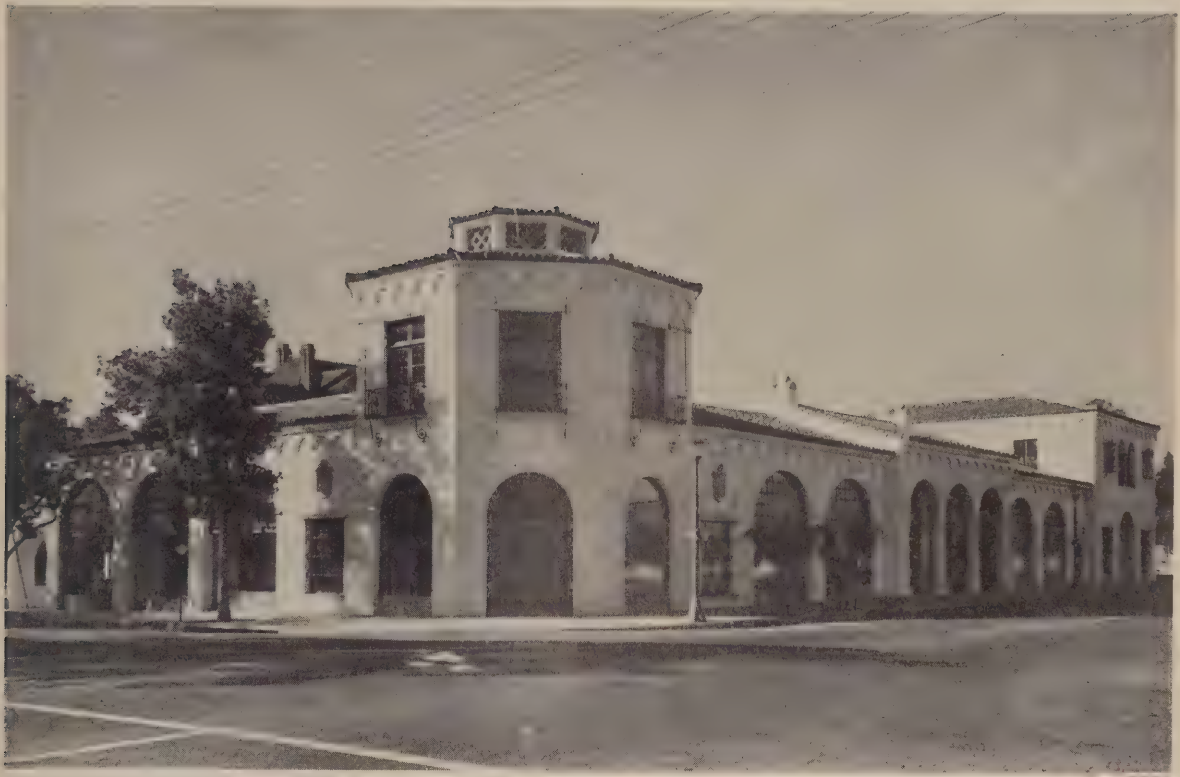


Photo. George H. Van Anda

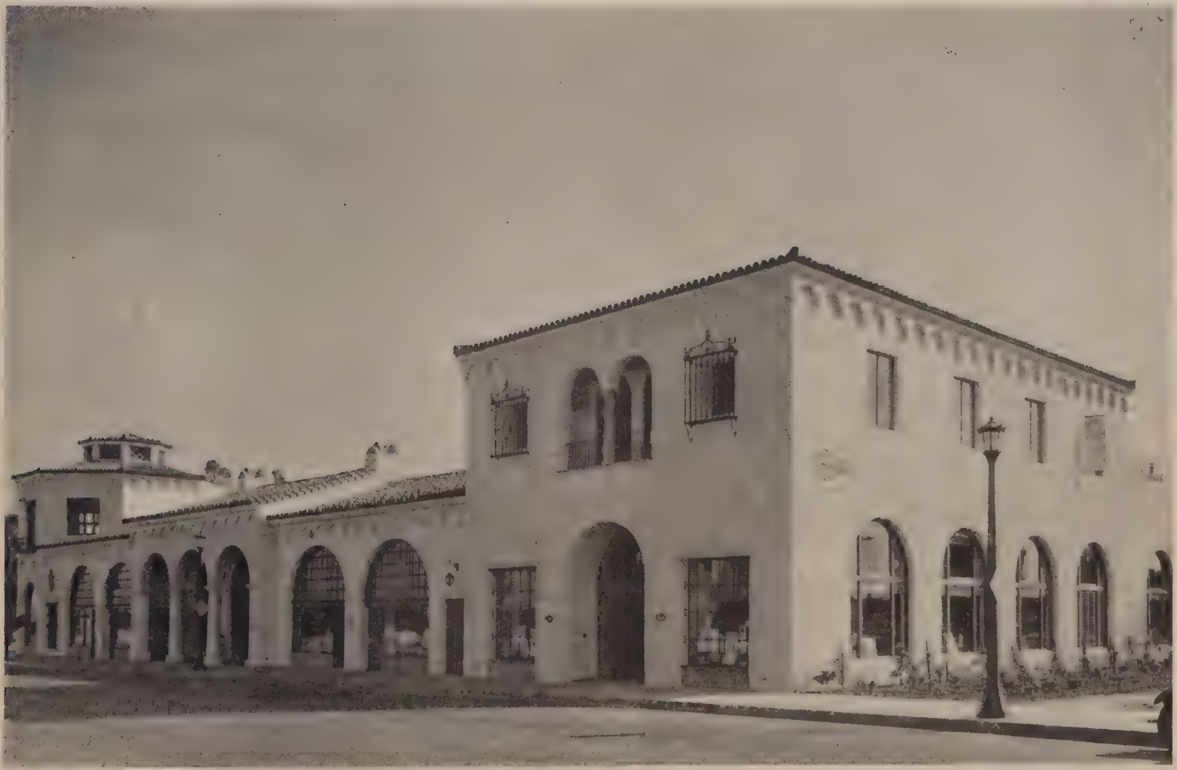
LOUIS SHERRY RESTAURANT, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS



ENTRANCE DOOR
LOUIS SHERRY RESTAURANT, NEW YORK
McKIM, MEAD & WHITE, ARCHITECTS



CORNER VIEW

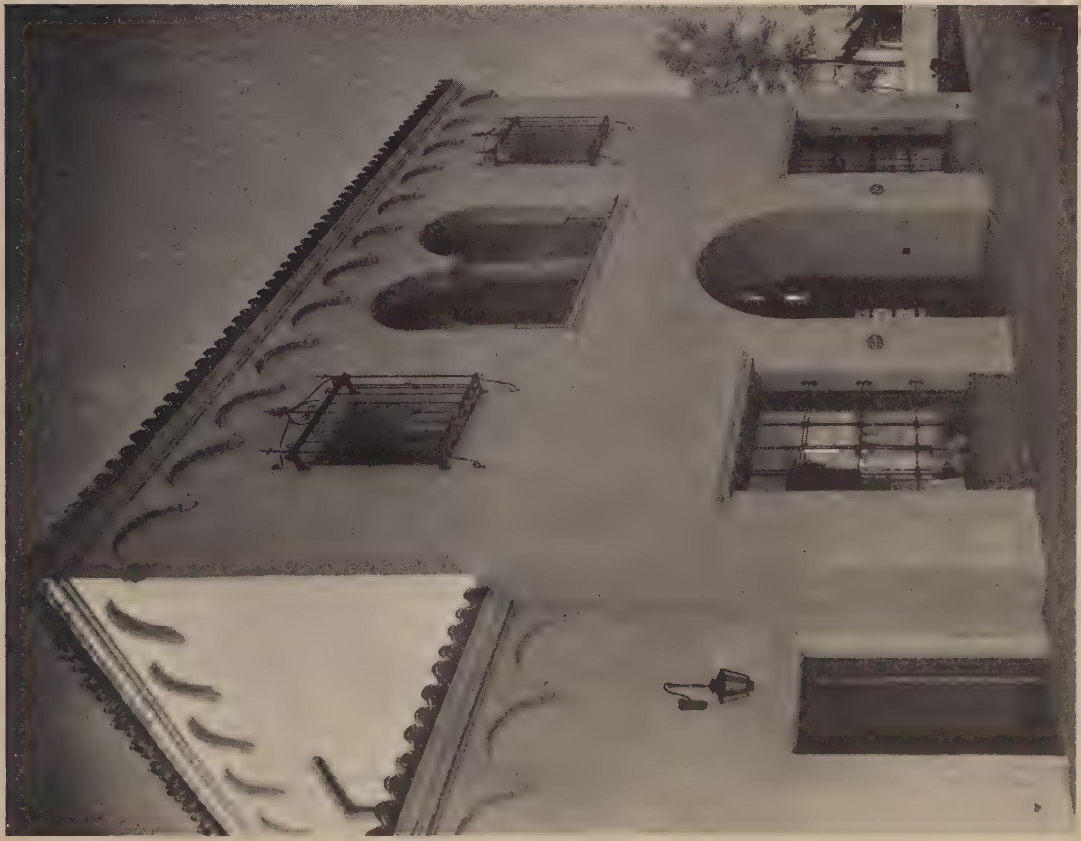


Photos. George Haight

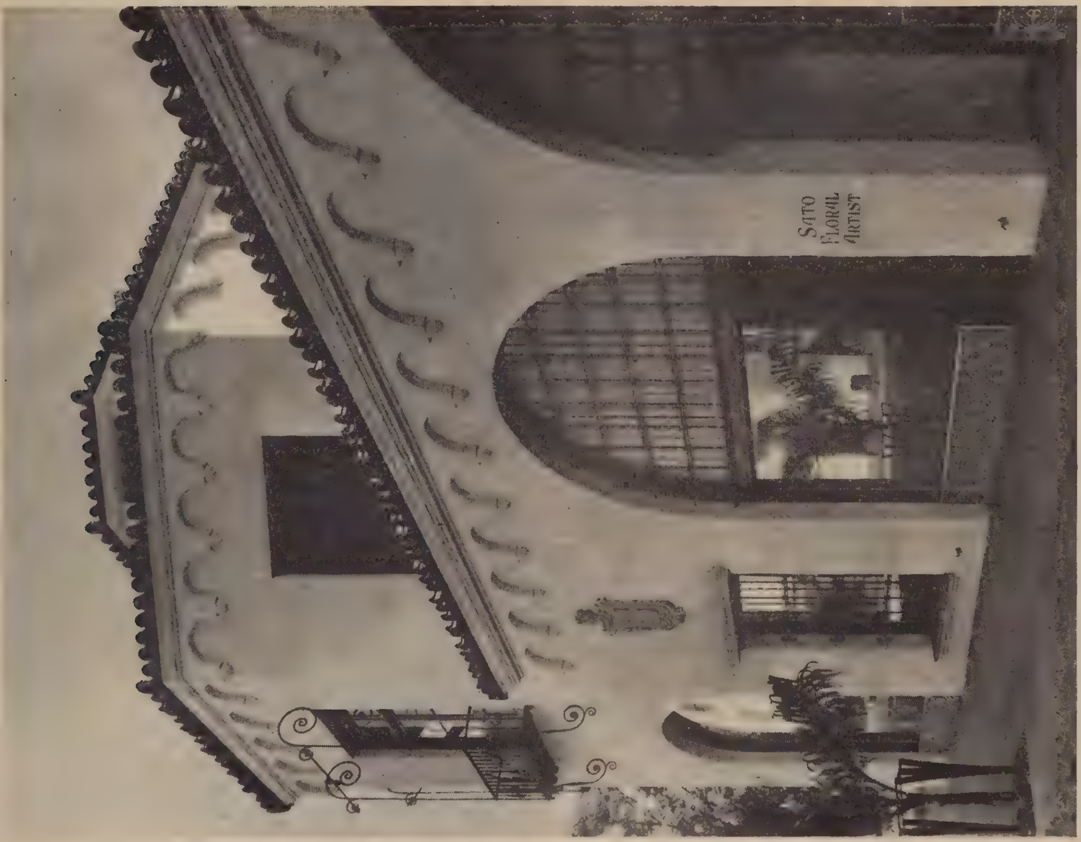
MAIN FACADE

TILT STORE BUILDING, PASADENA

KENNETH A. GORDON, ARCHITECT



CORNER BUILDING



SHOP WINDOWS

TILT STORE BUILDING, PASADENA

KENNETH A. GORDON, ARCHITECT

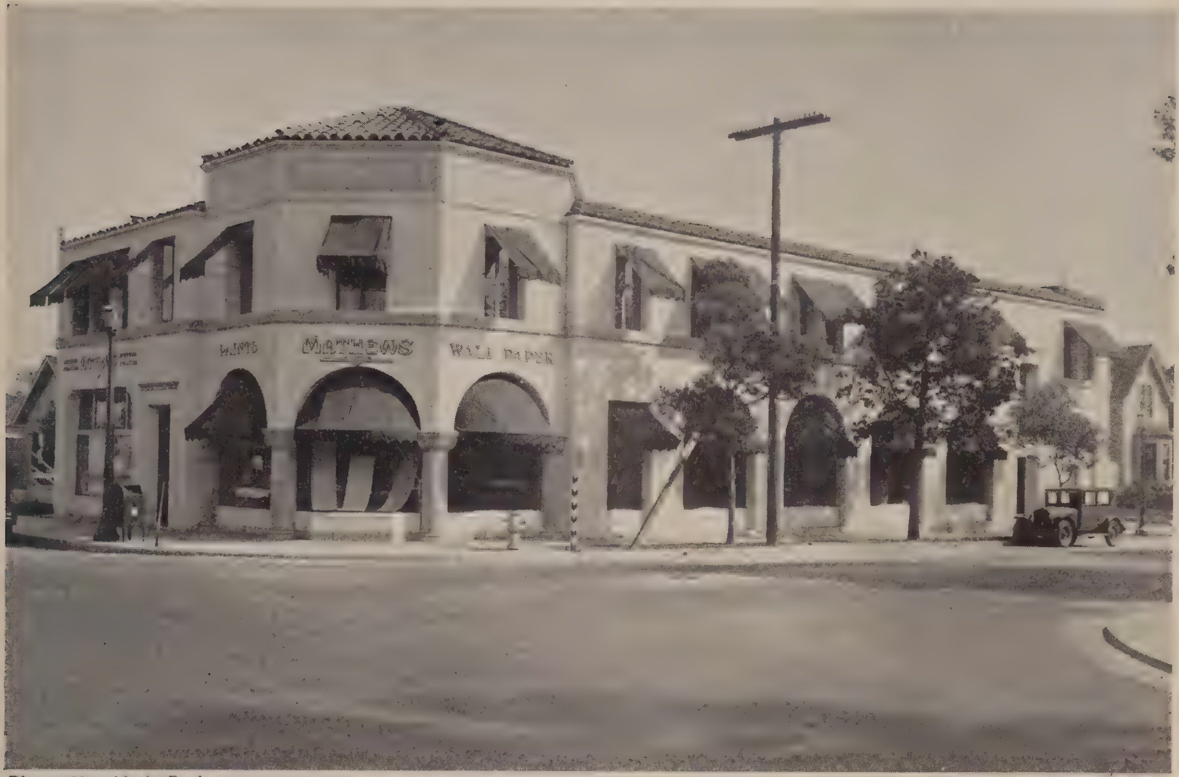


Photo. Harold A. Parker

SALFORD BUILDING, PASADENA

CYRIL BENNETT & FITCH H. HASKELL, ARCHITECTS

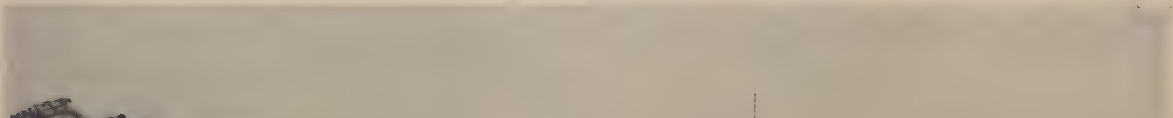


Photo. J. Walter Collinge

STORE GROUP, SANTA BARBARA

SOULE, MURPHY & HASTINGS AND EDWARDS, PLUNKETT & HOWELL, ARCHITECTS.

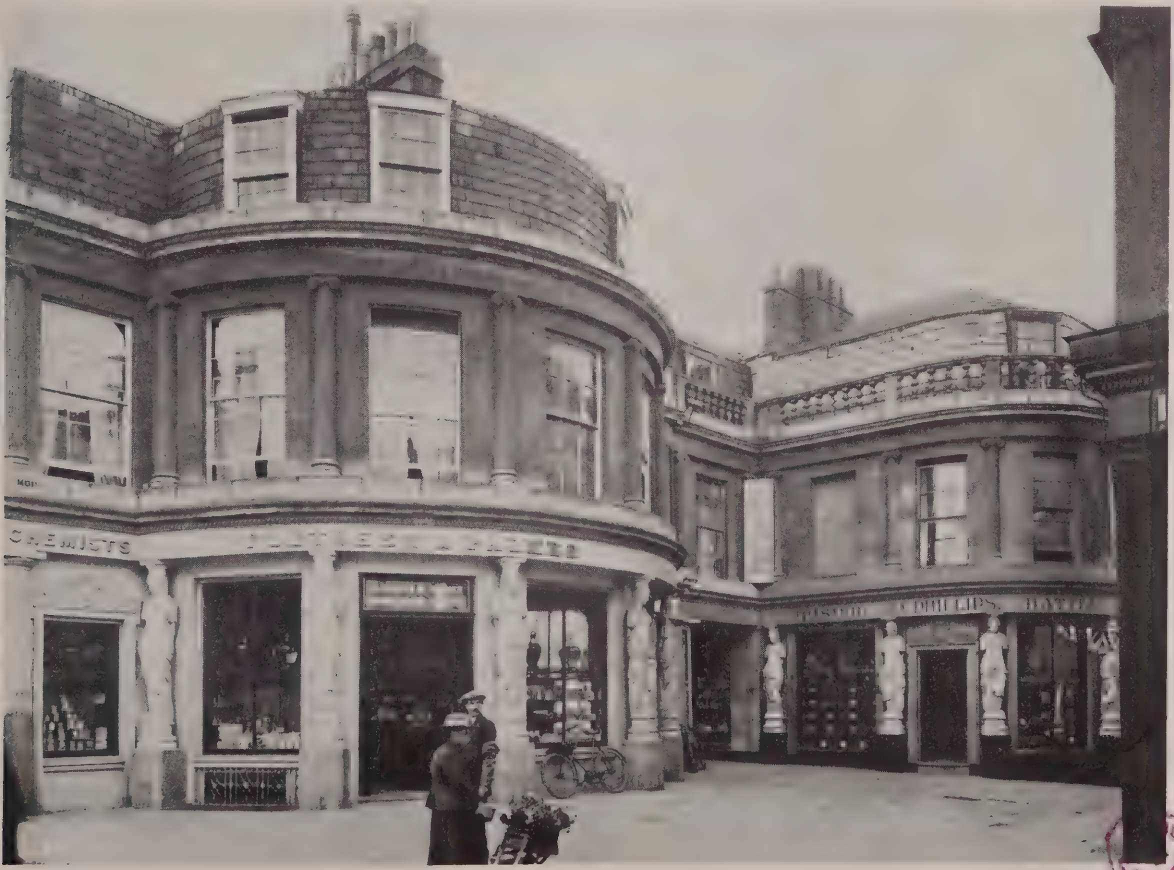
SHOP FRONTS IN COUNTRY TOWNS AND SMALLER CITIES

BY

HAROLD DONALDSON EBERLEIN

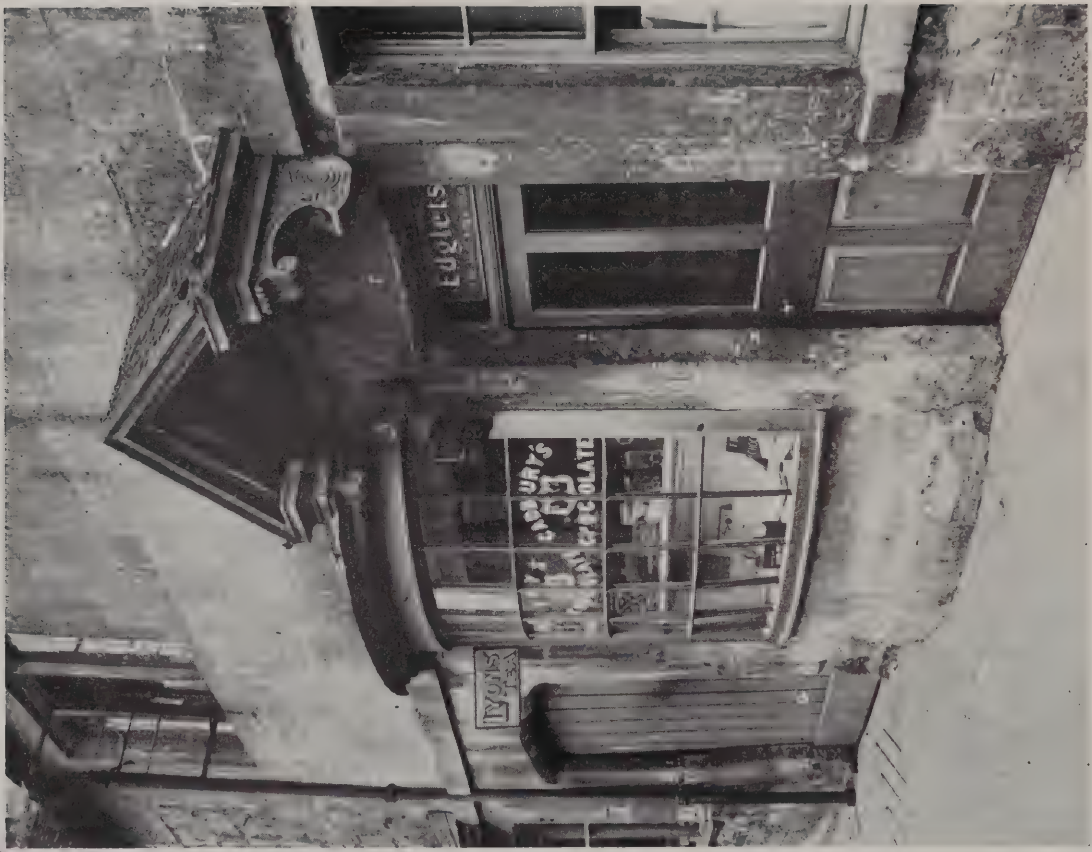
A SHOP front in the small city or in the country town or village might very properly be called a bit of "intensive" architecture. It is intensive in its appeal to the public, because within a very limited space it must fulfill the functions of advertisement and attraction. It must arrest the gaze of the passer-by, it must plainly declare the nature of the business carried on within, it must stimulate interest or curiosity, and it must exert whatever measure of enticement to go inside that it can be made to produce. Again, the shop front is intensive in its purely architectural bearing, because every item of structure and design must be concentrated in one elevation,—not seldom in only the lower part of one elevation; and,—a further restriction of scope,—this sort of architecture is entirely two-dimensional, unless the shop happens to be on a corner. The design of the small city or country town shop front, therefore, must needs be exceedingly direct and definite in its application. It is a concrete expression of the combined factors that have determined the wants it fulfills. The actual space occupied is entirely disproportionate to the effect produced, and, consequently, the maximum of result must be got from the minimum of means employed. A shop front of this kind must afford adequate light for the interior, it must afford proper display space for the shop keeper's wares, it must include means of protection when the shop is closed, and it must produce a desirable effect upon possible customers among the passing public. And the psychological element,—the attraction of interest and the inducement to patrons to enter,—is by no means the least important of the cardinal desiderata to be taken into account, although this subtle claim is often clumsily gauged or insufficiently provided for.

Another matter that too often receives but scant attention is the relationship that should always exist between the design of the individual shop front, on the one hand, and its immediate environ-

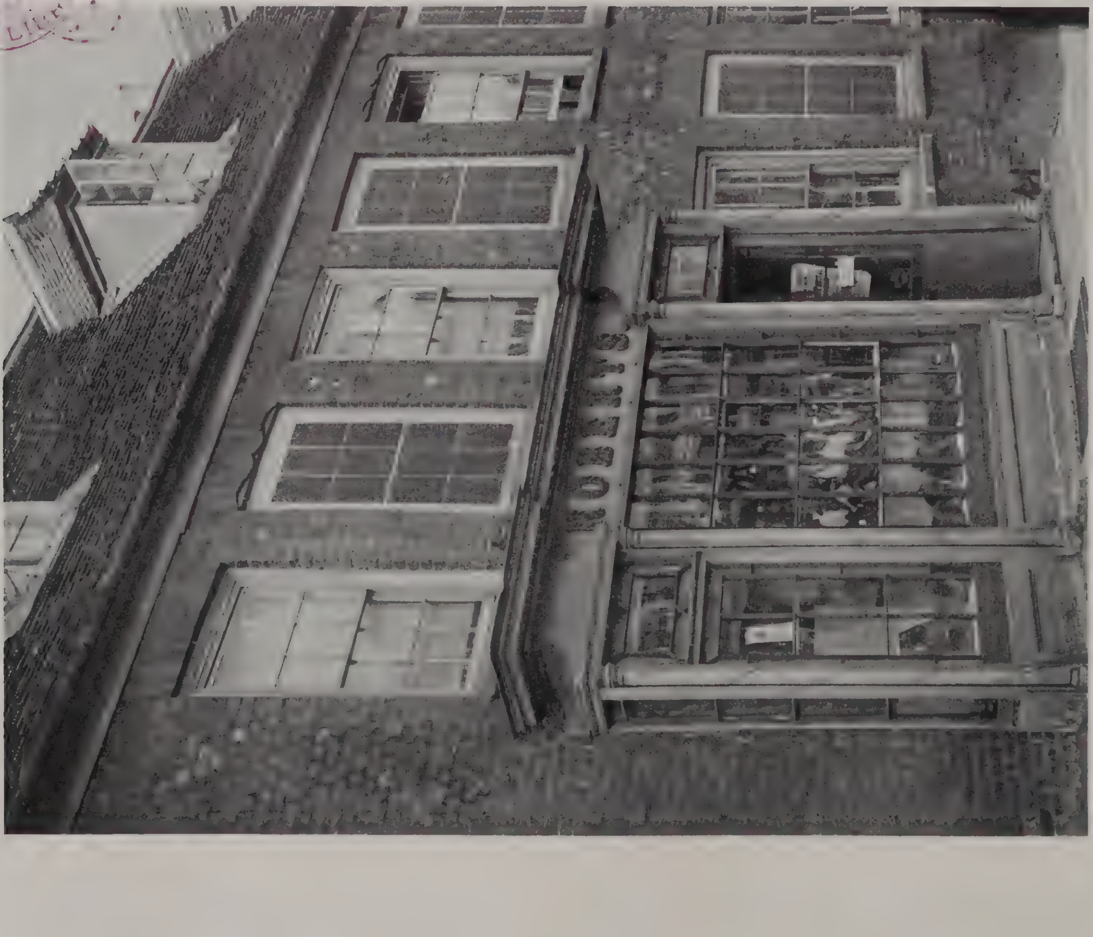


Shops in Montpelier Row, Cheltenham

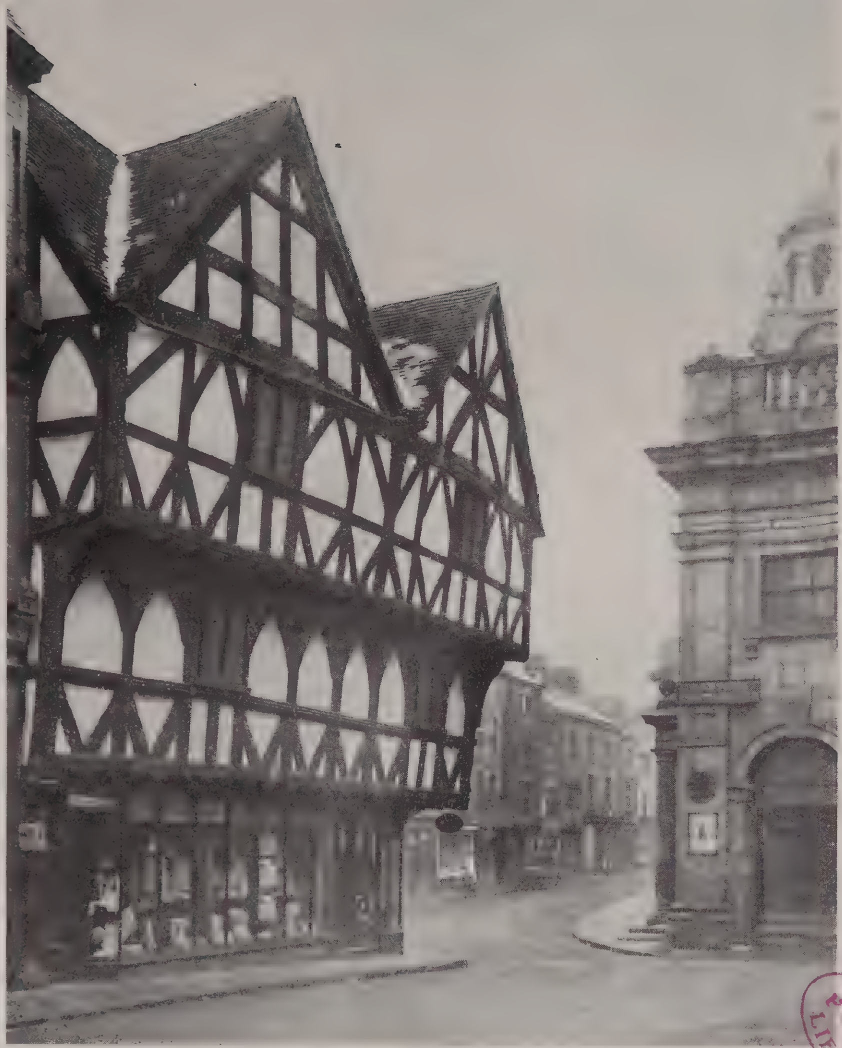
John Papworth, Architect



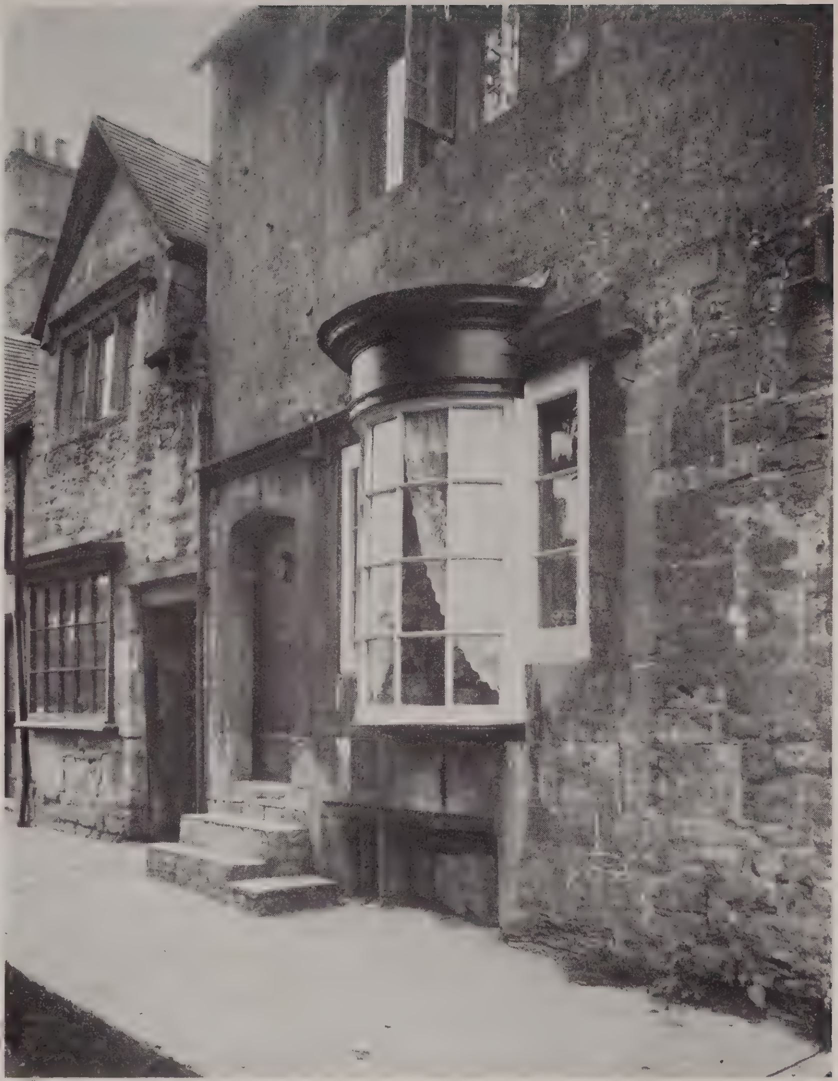
SHOP AT CHIPPING CAMPDEN



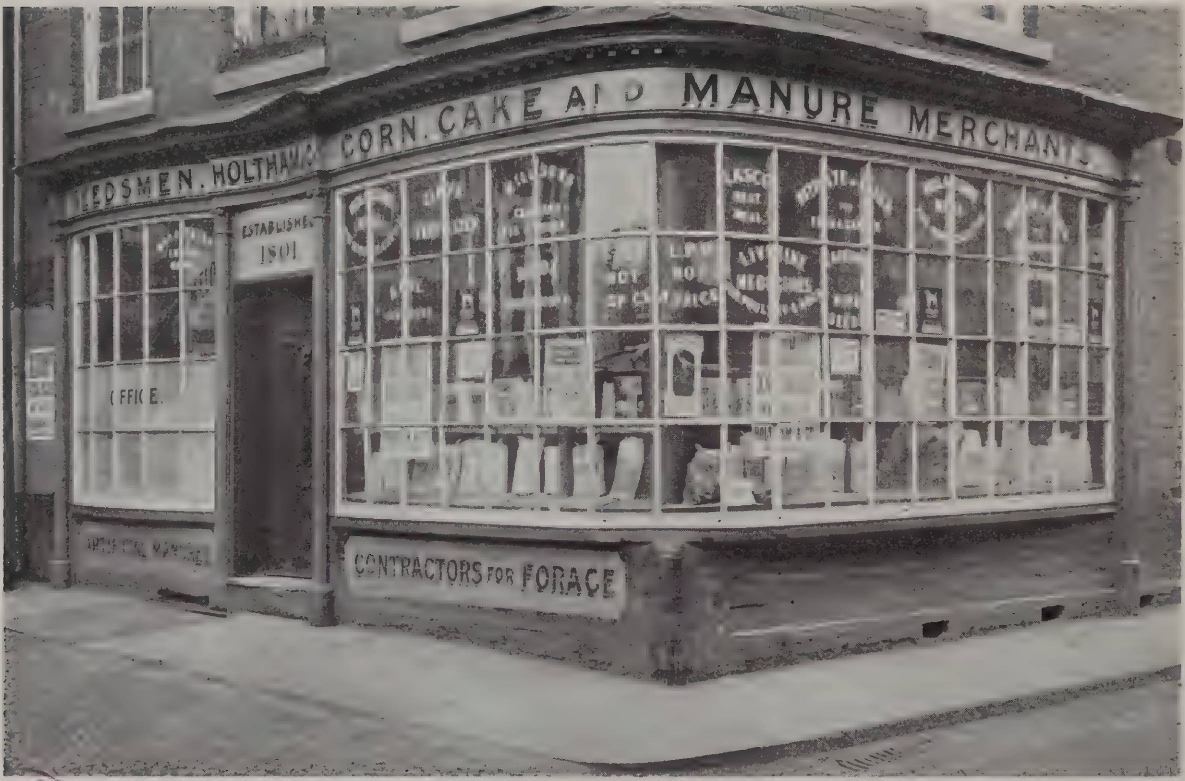
A SHOP AT WOBURN



15TH CENTURY HALF-TIMBERED BUILDING AT
LUDLOW, SHROPSHIRE



LATE 18TH CENTURY BOWED SHOP FRONT AT
CHIPPING CAMPDEN



LATE 18TH CENTURY SHOP AT WORCESTER

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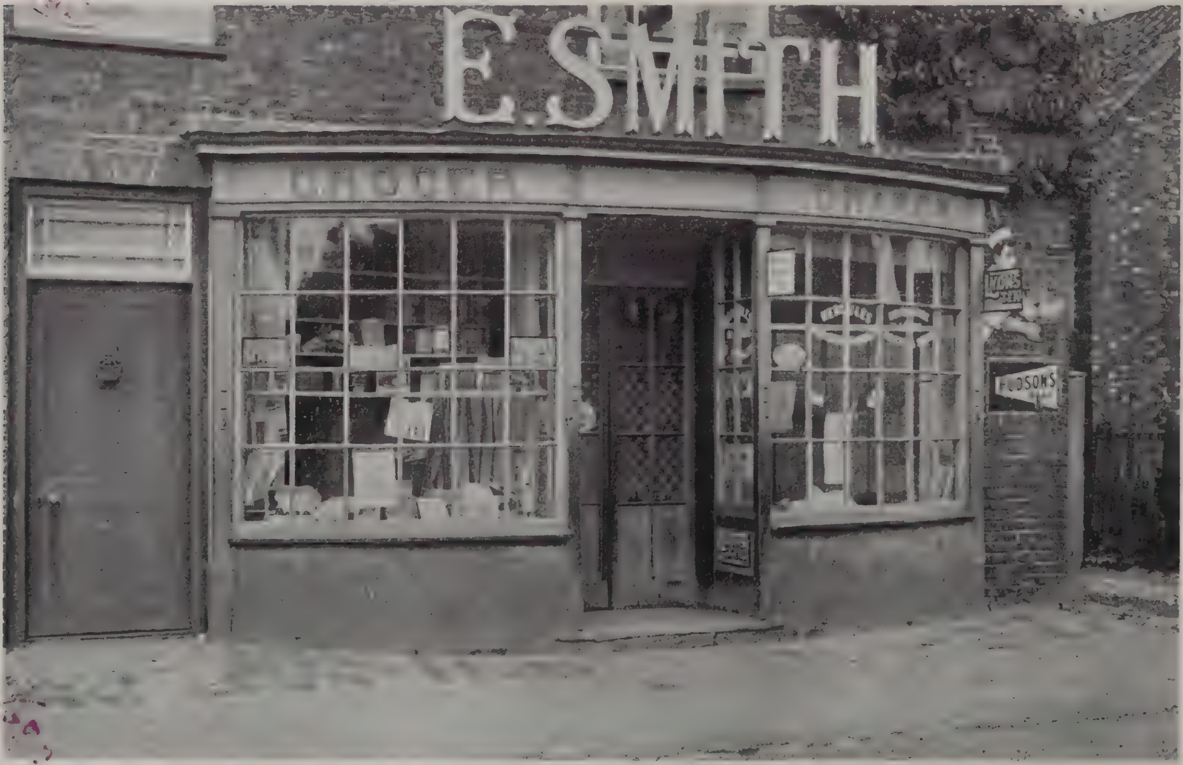
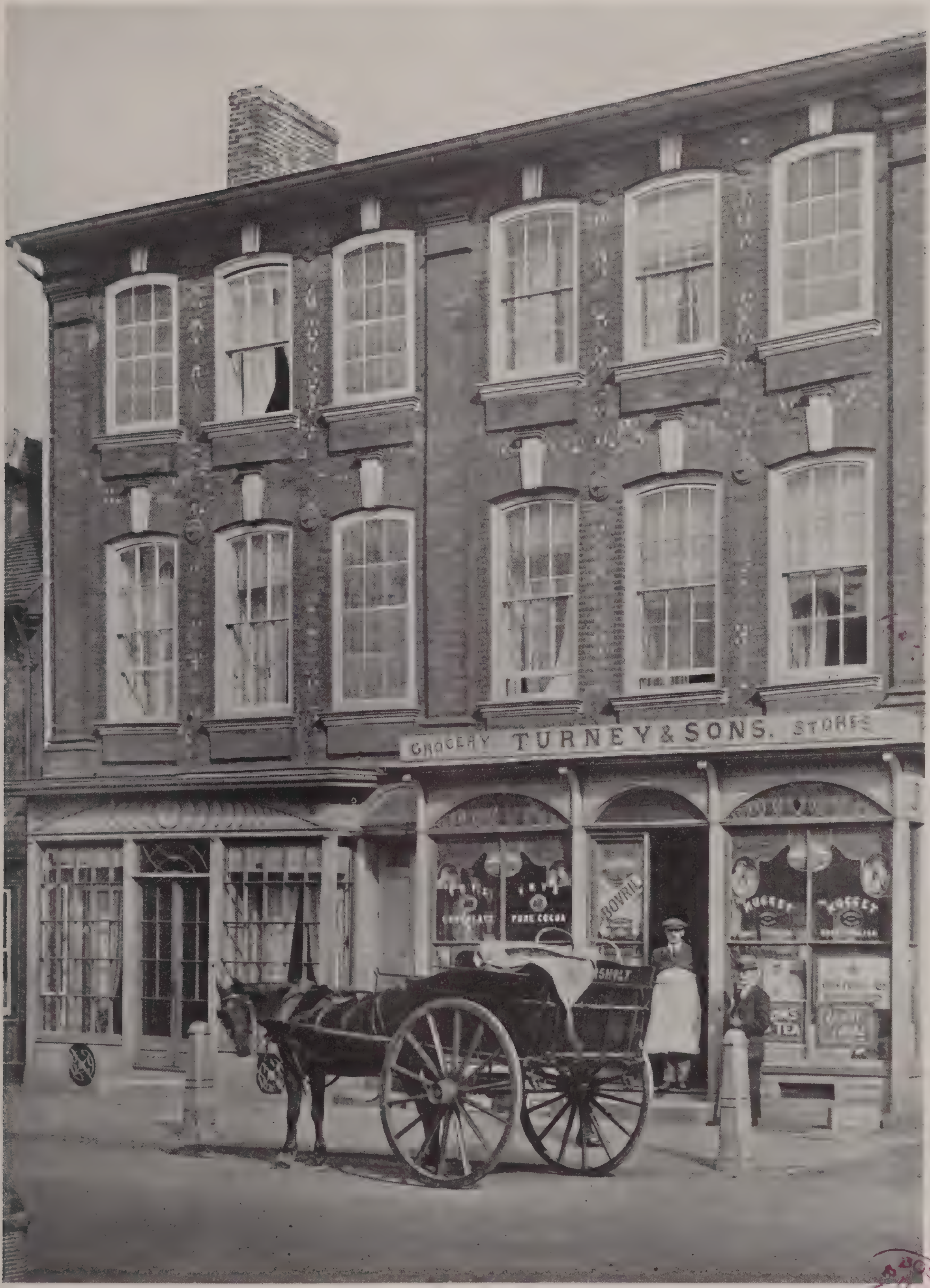


SEGMENTAL BOWED SHOP FRONT AT STILTON



REGENCY SHOP FRONTS AT WOBURN

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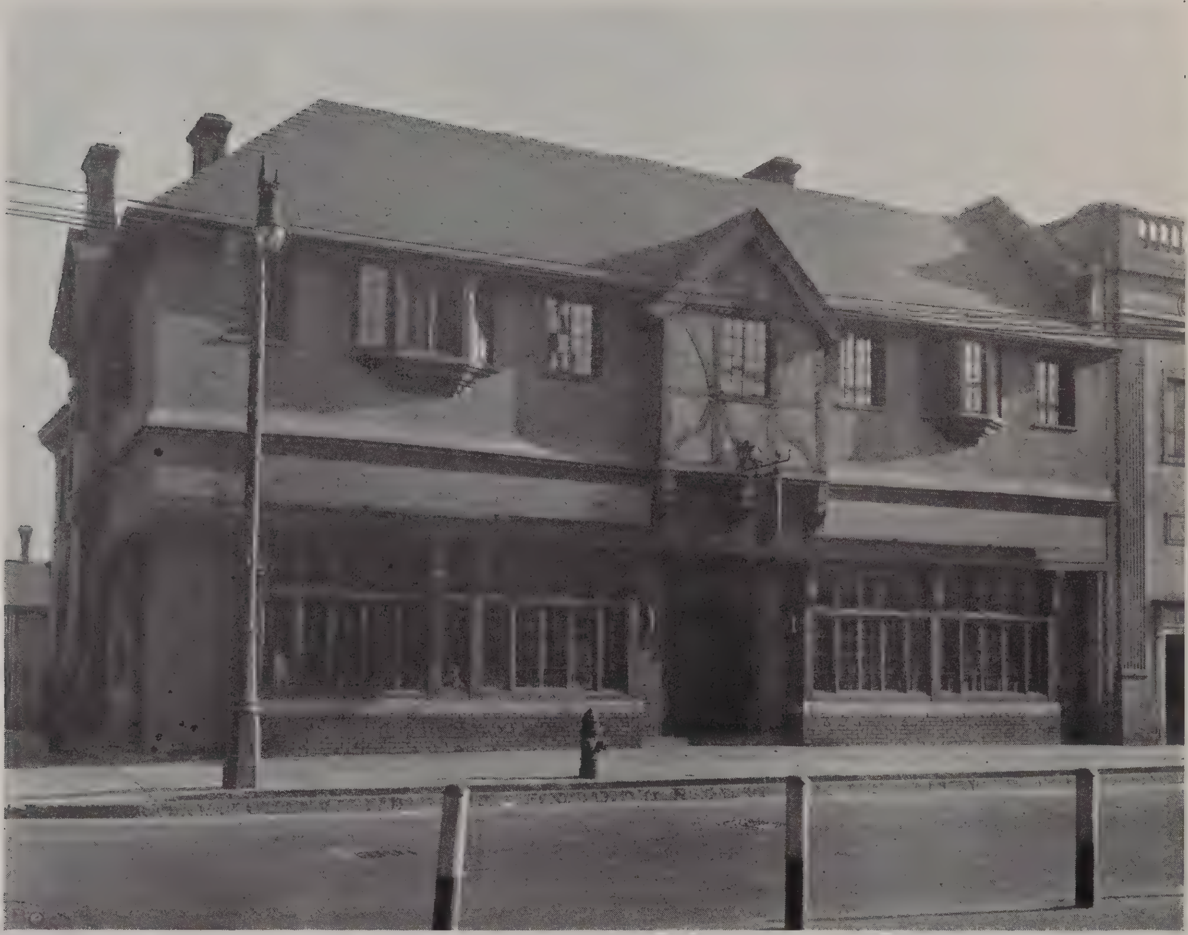
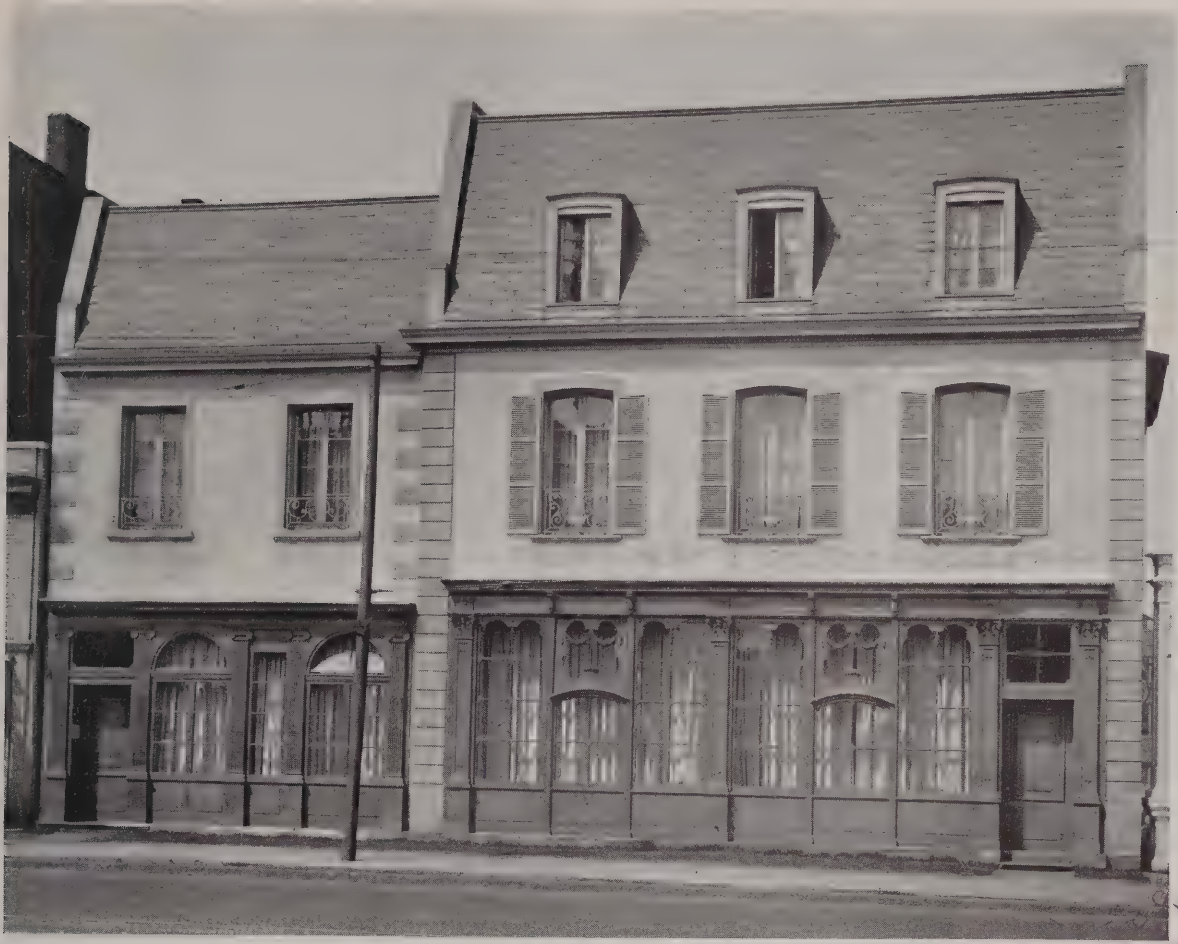


Photo. Thomas Ellison

Mermaid Shops, Detroit
Robert O. Derrick, Architect
Branson V. Gamber, Associate

ment on the other; and heed to the environment, be it noted, must extend to the general character of the neighborhood as well, and not stop short at the adjacent frontage on each side. Disregard of this highly important relationship principle is to blame, time and time again, for the stark incongruity that confronts the eye in many a place where shop fronts have been planned in a merely perfunctory, abstract manner without taking duly into account the conditions existing in the vicinity.

There is no branch of architectural endeavor where conscientious effort is more needed at the present moment than in the field of shop front design in our country towns and smaller cities. Notwithstanding the admirable precedents of earlier generations that have been left to us, and despite the praiseworthy achievements of our own time to be seen in not a few places, the fact remains that good shop fronts are, for the most part, isolated amid surroundings that are utterly unworthy, and either totally lacking in character or else positively objectionable. Examples of well designed shop fronts stand forth conspicuously from deserts of dreary banality and arrest the eye all the more forcibly because they are of such rare occurrence. To be convinced of the truth of this assertion, which perhaps seems sweeping and not overly optimistic, one need only take a casual tour with open eyes through some of our country towns and smaller but ambitiously progressive cities. Such a tour will reveal the fact, beyond all peradventure, that the average quality of shop front design in the places indicated is in a very bad way indeed. Notwithstanding the plainly evident desire of wide-awake shop keepers in country towns and in the smaller cities to emulate the manners and methods of successful shop keepers in large cities, most of them have apparently failed to grasp the psychology of the situation. And this is not true of America only, but of England as well. In France, where "things are ordered differently," some kind providence seems to have prevented such a widespread blunder. It may be because the Frenchman is naturally likely to be in small matters a much more astute psychologist than the Anglo-Saxon.



Esling Studios, Detroit
Robert O. Derrick, Architect
Branson V. Gamber, Associate

Only recently the writer had occasion to drive in one day through four "up-and-doing," highly prosperous small cities in the middle states, cities that pride themselves on their civic spirit, their enterprise, and the thoroughness with which they are achieving results. They would probably resent being called "small" cities. In between them were scattered comfortable and forward-looking towns. With a top eye open for shop fronts, it was impossible not to make comparisons and do some generalizing. The same general aspect was common to these four small cities with their intervening country towns, just as in other small cities and towns visited at a slightly earlier date. Almost without exception, in the districts where dwelling houses had been converted into shops, as well as in those districts wholly rebuilt for business purposes, the same unedifying condition prevailed. There was a monotonous and unconvincing succession of large areas of plate glass, without coherence or trace of individuality whereby to distinguish one shop front from another, or even to tell where one ended and another began. Often the glass plates were riveted together at the corners, where angles occurred, so that no break of other supporting material that might form a line of demarcation was needed. In many instances, the only indications of frontage boundaries were the set-backs where shop owners had not brought their premises out to the full limit of the building line. An entire block in one place looked as though it had been transformed into one enormously long show case containing a bemuddled, jumbled medley of goods in a state of untidy disorganization. Radio sets, washing machines, hats, ribbons, shoes, gas stoves and electric heaters appeared in a promiscuous assemblage, confusing to mind and eye alike.

It was a snarling jazz of shop windows without any architectural articulation to give the least semblance of coherent form or arrangement,—to say nothing of comprehensible order,—where all the fronts were as like one to another as "tweedledum and tweedle-dee," when by no chance any point of division at all could be descried, to give such a thing as individuality to any one shop.

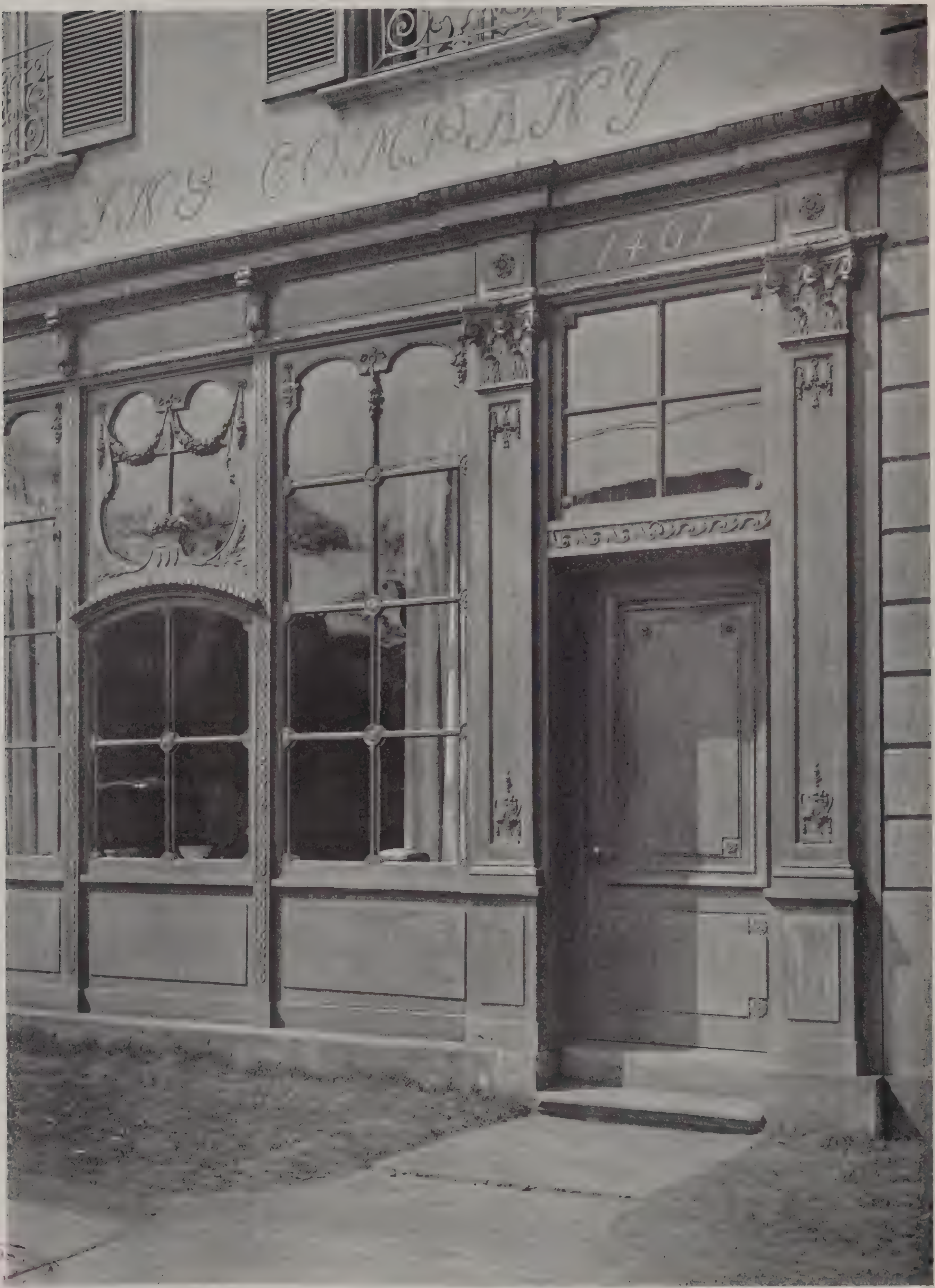
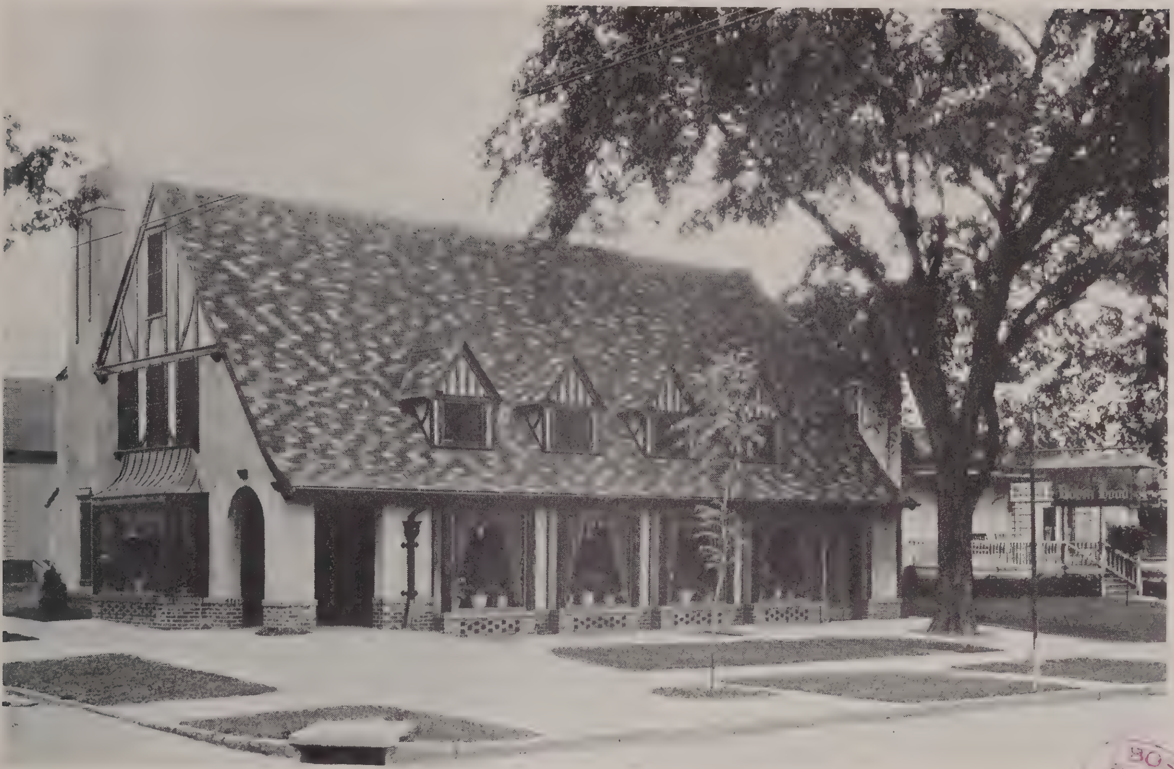


Photo.-Thomas Ellison

ESLING STUDIOS, DETROIT
ROBERT O. DERRICK, ARCHITECT
BRANSON V. GAMBER, ASSOCIATE



DONAGHY DRUG COMPANY, KENT, O.
KISTLER & GREGG, ARCHITECTS

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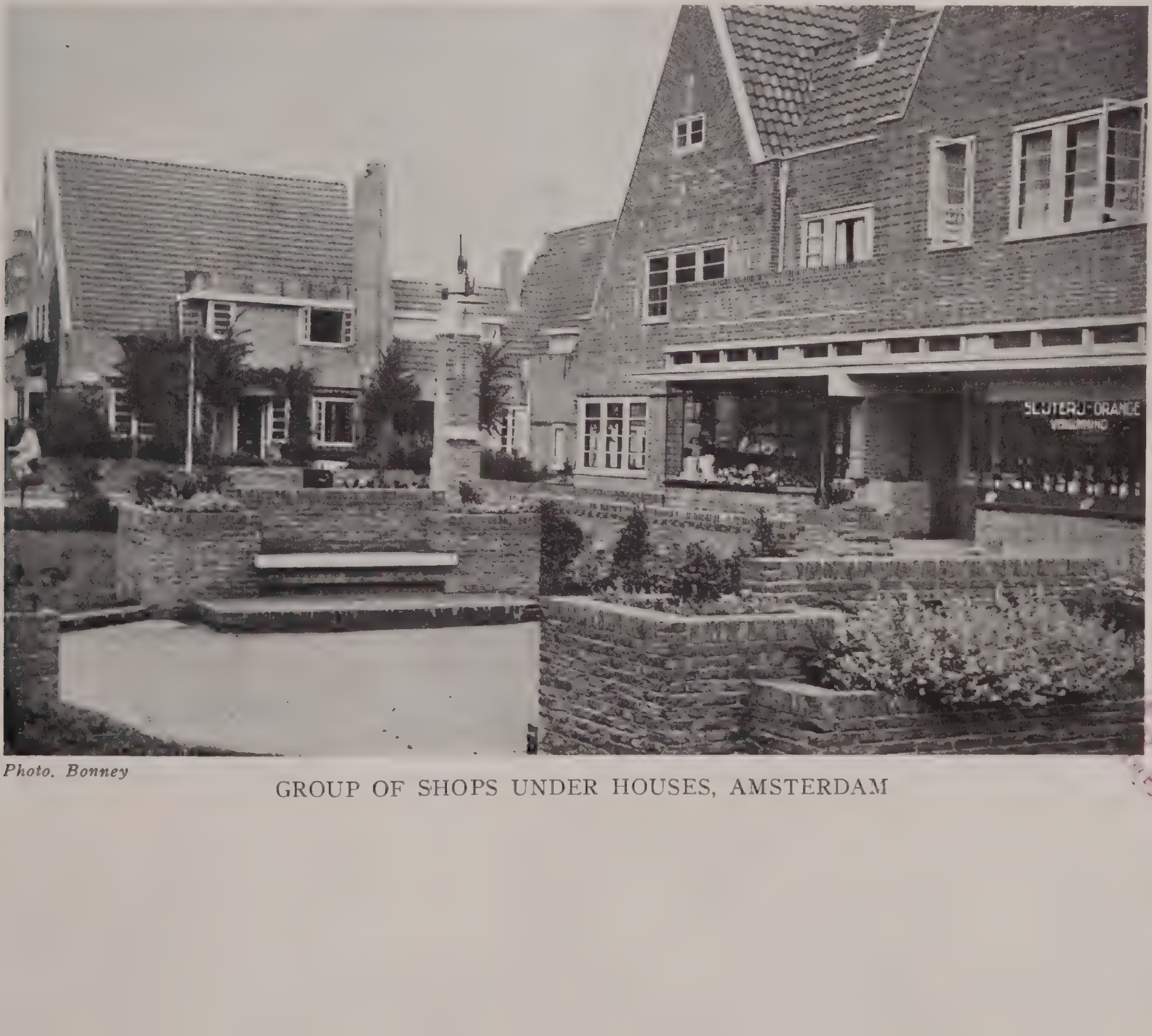

Photo. Bonney

GROUP OF SHOPS UNDER HOUSES, AMSTERDAM

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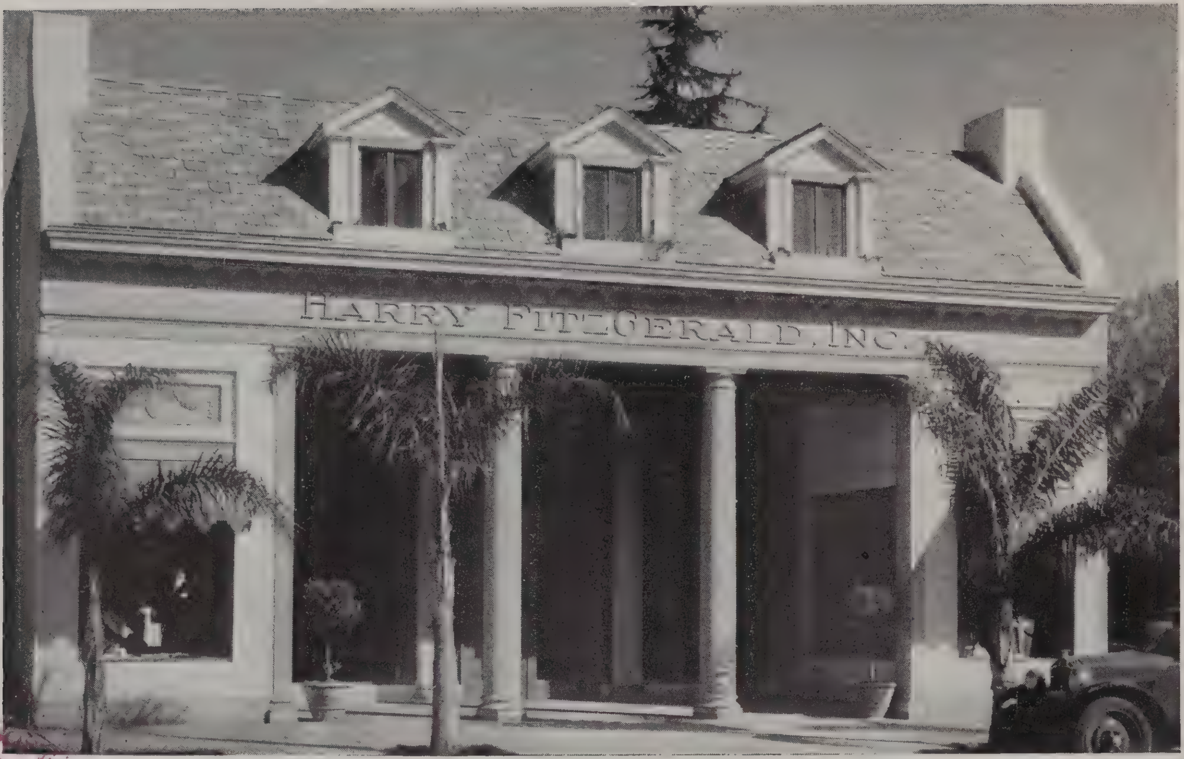

Photo: George Haight

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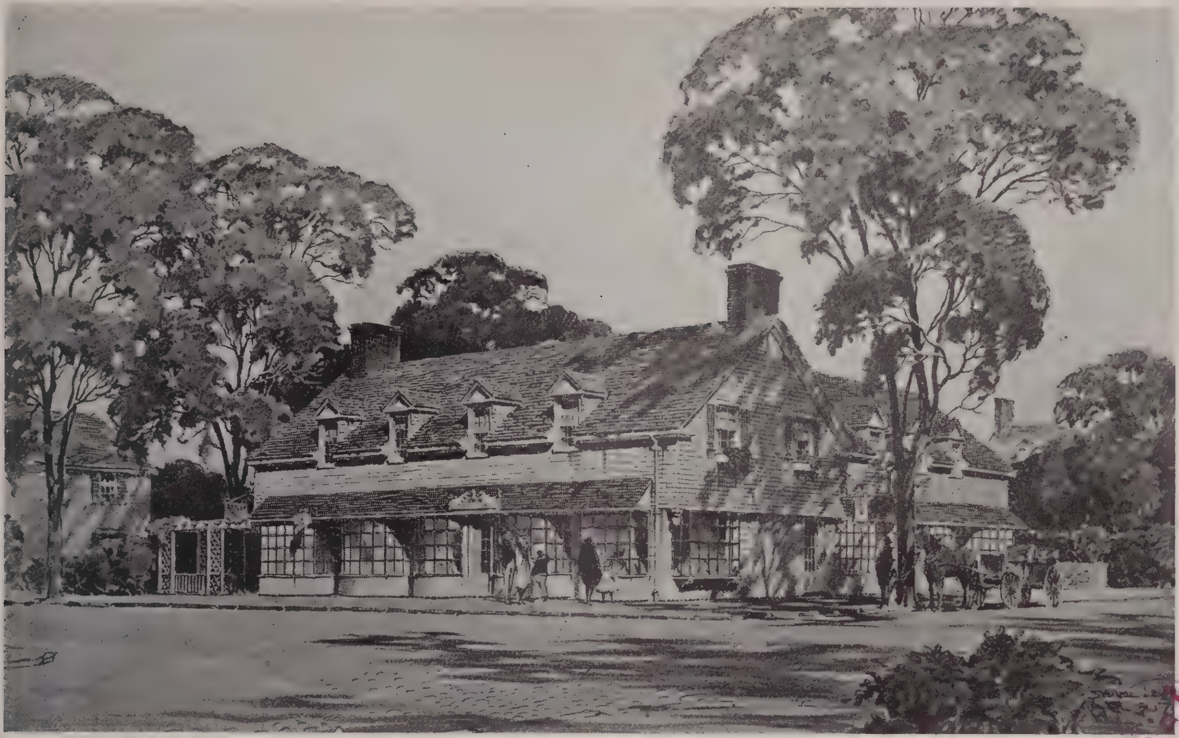
Shop for Harry Fitzgerald, Inc., Pasadena
Cyril Bennett & Fitch H. Haskell, Architects

If the individual shopkeeper is prepared to surrender the individuality of his establishment, and to sacrifice the advertising advantages to be derived from such individuality to the glorification of plate glass and the blazoning of his neighborhood's commercial push, then the present prevailing method of shop front treatment is to be commended. If, on the contrary, the merchant of the country towns or the smaller cities is not more willing than his compeer in the large city to submerge his own identity and the identity of his shop in the blare of surrounding business bustle, then he must radically readjust his psychological attitude and call in the aid of intelligent architectural design to save him from the flood of "Main Street" banality and standardized lack of character.

The shop front is one place where standardization of any sort will not apply; in fact, it is a positive detriment to the shop keeper, as experience has abundantly shown. It is vitally important to the shop keeper's interests that he preserve the individual identity of his shop. Successful shop keeping in the largest cities has sufficiently demonstrated this fact. It is a serious business mistake on the merchant's part to try to rid his premises of "architecture" and to put all his faith in the utmost possible area of window display space. Appropriate architectural design is indispensable to the shop front. This is said without reference to the particular mode of architectural expression employed, whether it be based on one of the traditional styles or devised in the most ultra-modern vein. Distinction is the essential element, and this quality only architectural treatment can impart. Such distinction is not only an appreciable but a vital asset. That the conditions just outlined obtain not only in America but in England also, has already been noted. To mention only two examples,—far enough away not to tread on the American reader's toes,—the charm of both Gloucester and Cheltenham streets is rapidly vanishing under the process of "modernization" of old shop fronts that were erstwhile rich in the quality of individual distinction and plentifully endowed with the psychological appeal that would stimulate the interest and curiosity of possible customers passing along. These fascinating old fronts, full of the suave serenity and pose of eighteenth and early nineteenth century design, and strong in the allurement that would draw the passer-by inside to pursue the investigation of wares half displayed, half concealed in the windows, are giving place to all-glass display cages from which every trace of architectural amenity has been completely banished. The shop keepers are perpetrating this destruction under the fallacy that they are being quite "up-to-date" and "modern." They seem to forget, or not to know, that goods too obviously displayed lose much of their power of enticement. The full display, with mir-



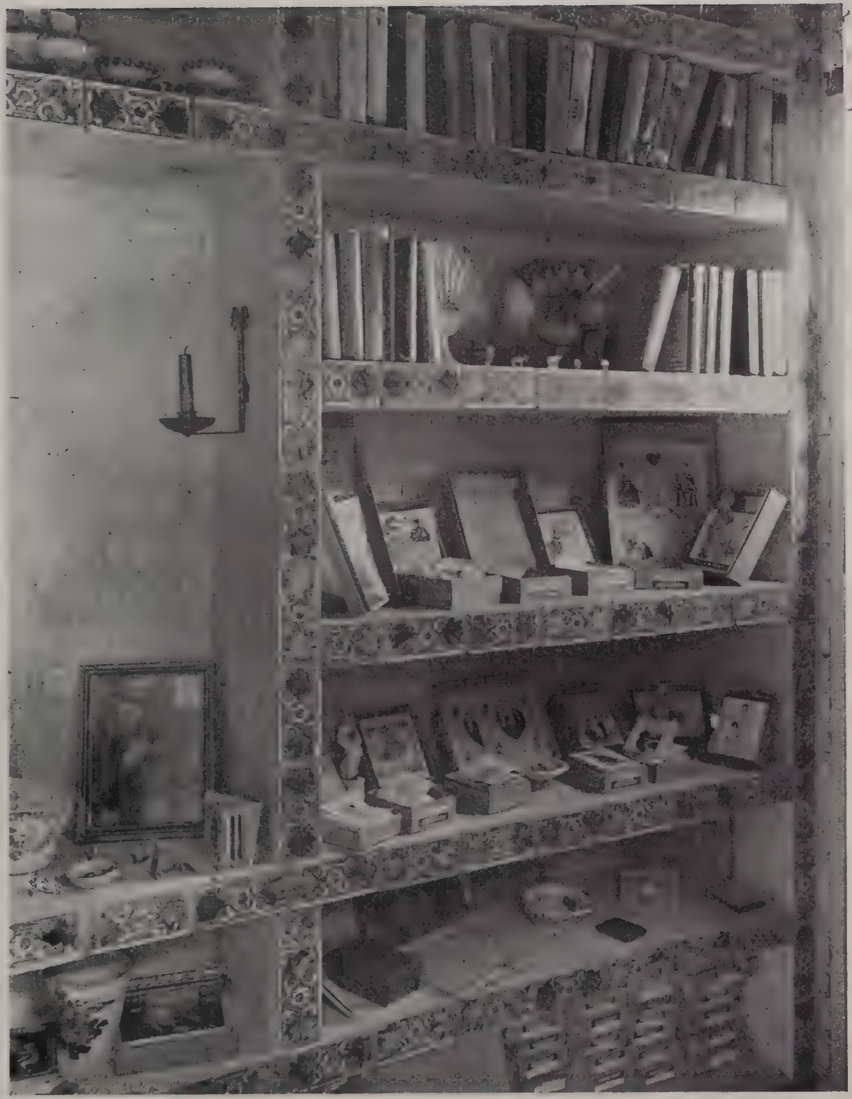
OSTON PUBLIC LIBRARY

Photo. Mattie Edwards Hewitt

Shops for Edward Hawkes, York Harbor, Me.
Roger H. Bullard, Architect

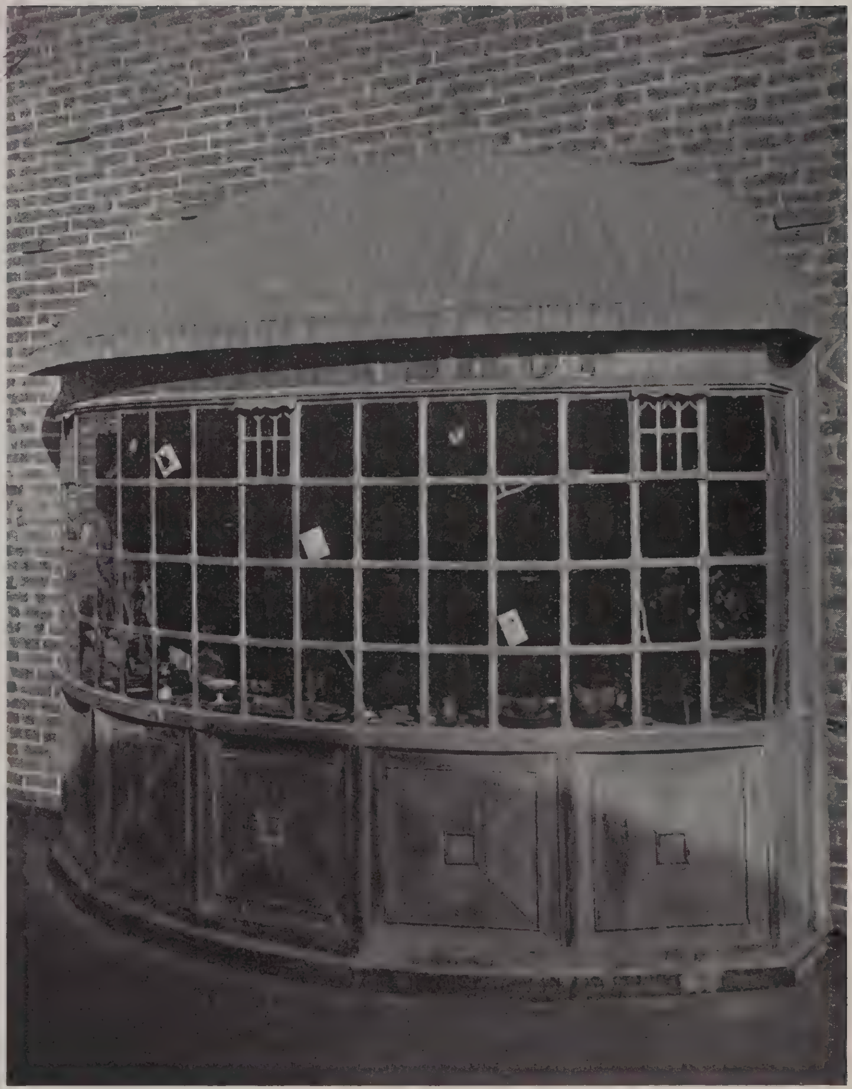
rors behind so that every item may be surveyed fore and aft, leaves no questions unanswered; the passer-by gets the whole story at a glance, and goes on. The eighteenth century muntins and small panes disclosed just enough to whet the interest and invite further inspection from within, where a good salesman would probably succeed in selling either the article that had first elicited inquiry or something else,—at any rate, a sale would be made, which is what the merchant desired.

In view of the appreciable value to the shop keeper of the psychological appeal, to say nothing of the pleasure to the general public, consider for a moment the subtle attraction and the individual distinction of such shop fronts as those at the lower end of Montpelier Row, in Chelthenham, designed by Papworth in 1826; of the little Regency shoe shop in Woburn, where hob-nailed boots are apotheosized by the setting; of the bowed front in Chipping Campden, now turned into a dwelling; of the corn merchant's late eighteenth century corner shop front in Worcester; of the little grocery shop at Stilton; or of the pair of early nineteenth century shop fronts at Woburn, comparison between which forcibly demonstrates the wisdom of keeping the original glazing. The keepers of the "Antique Galleries" and the "Mermaid Book Shop" in Detroit, it is encouraging to note, have evidently grasped the psychological factors involved in shop front design. So, too, have the designers and occupants of the Esling Company's premises in the same city, while the building devoted to small shops at York Harbor is peculiarly gratifying because the architect has not only perfectly recognized the underlying psychological principles, but has also shown very proper regard for the general surroundings and the local architectural genius. But good shop front design for the country town and the small city is by no means confined to traditional modes of expression. Witness the highly engaging shop front with bowed window at Forest Hills, N. Y. It cannot be ascribed to any traditional provenance. It is thoroughly modern, and thoroughly charming. Much commendation, too, is due the group of small shop fronts in Amsterdam and, likewise, the pleasant little addition to Jay's, in Boston. Other noteworthy instances, here illustrated, of heeding the vernacular genius in shop front design may be found in the groups of patio shops in Pasadena and Carmel, Cal. The Pasadena Arcade Building leaves nothing to be desired in the individual identity of the shop fronts it embraces, and the other cardinal desiderata of design are likewise accounted for. The street and patio arrangement of shop fronts in the El Paseo Building at Carmel fulfills the requirements of both good taste and common sense suitability, along with the bestowal of character that every shop keeper is wise in demanding.



Photos. S. H. Gottscho

TILE-FACED CONCRETE SHELVES



EXTERIOR OF SHOW WINDOW

THE PATIO SHOP, FOREST HILLS, N. Y.
ROBERT TAPPAN, ARCHITECT

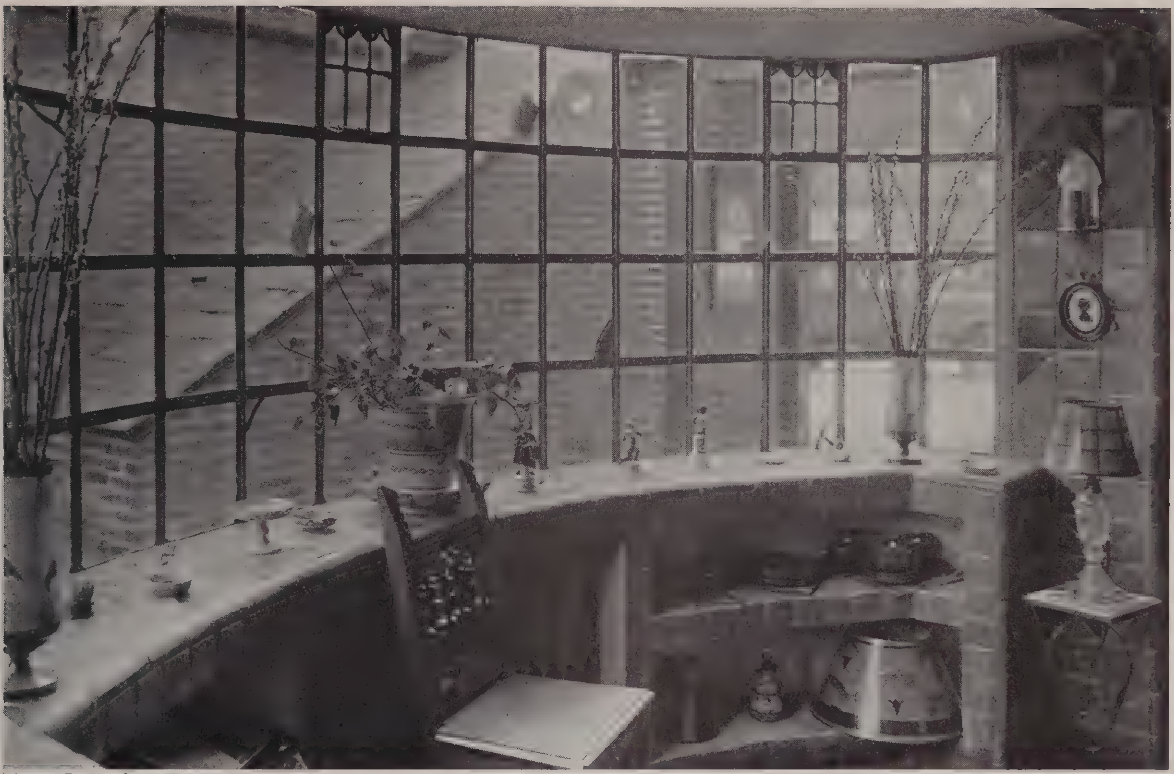
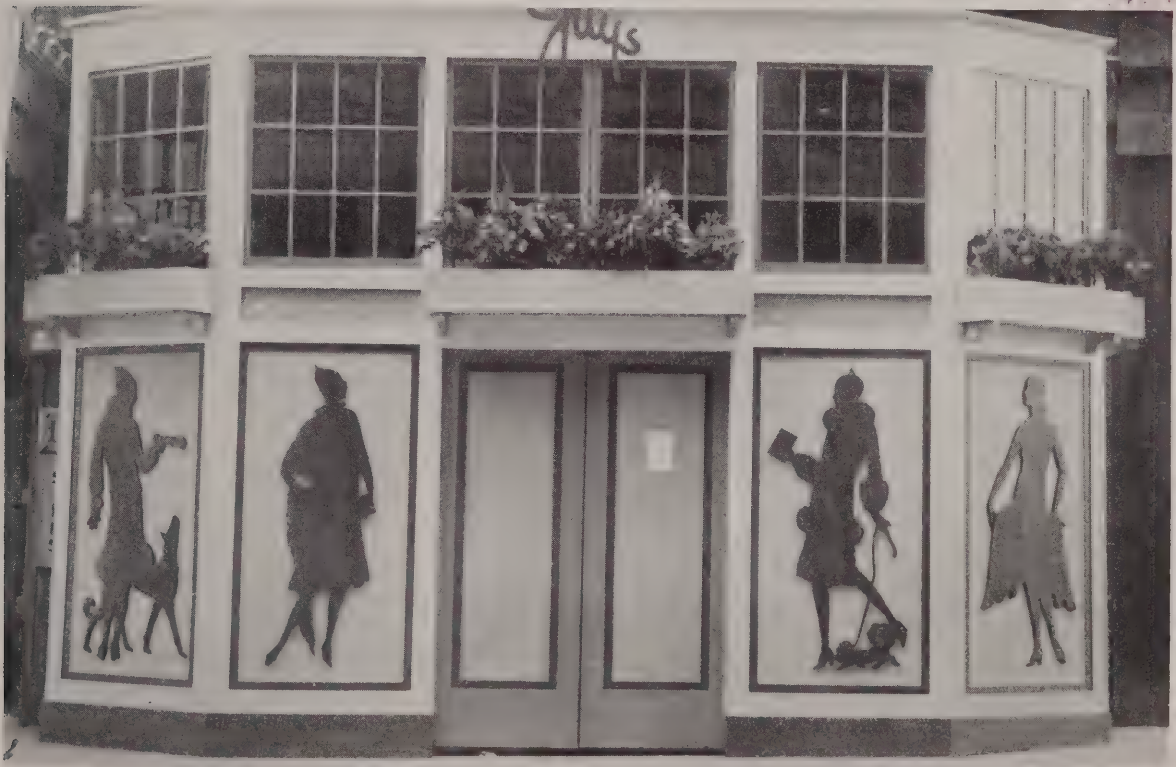
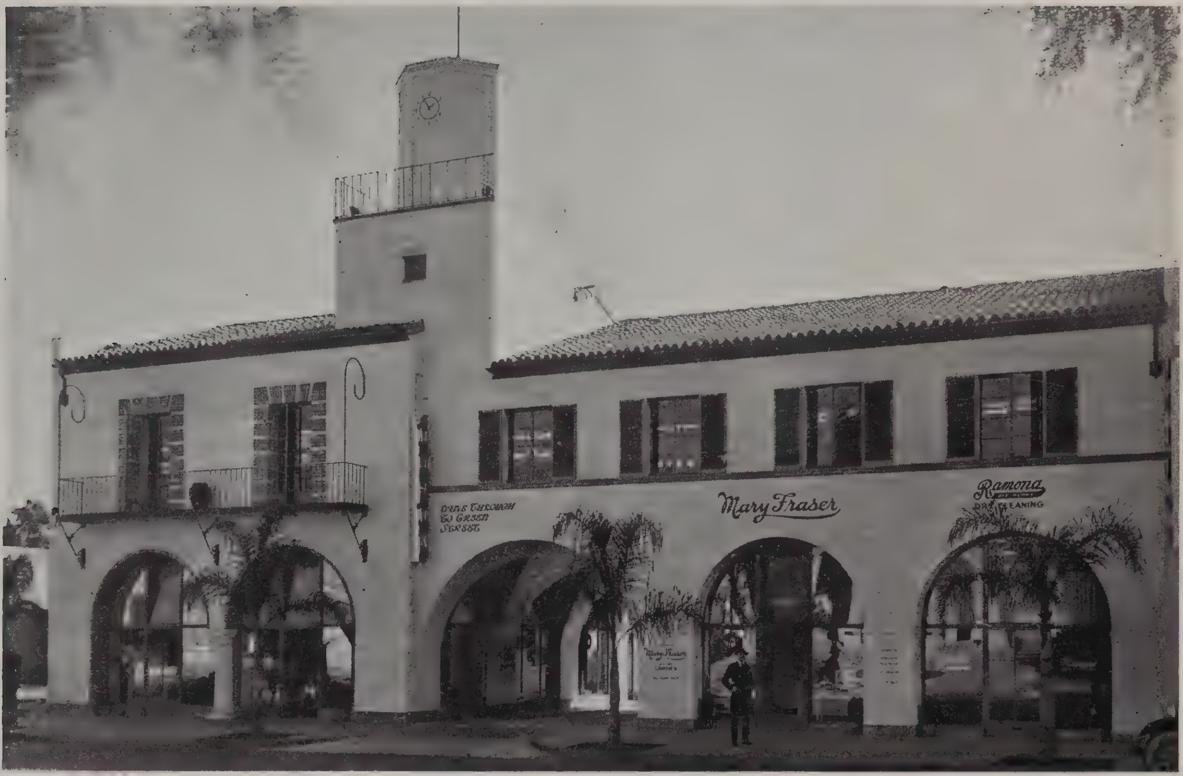


Photo. S. H. Gottscho

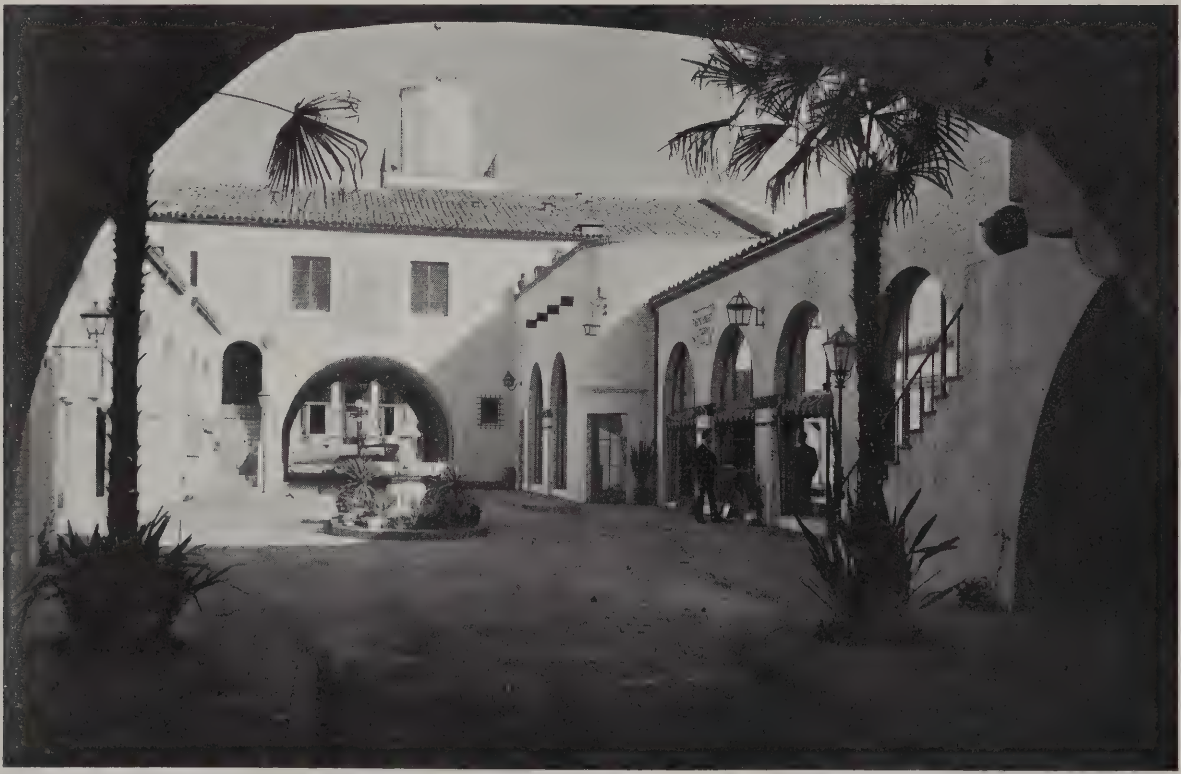
INTERIOR, SHOW WINDOW, THE PATIO SHOP, FOREST HILLS, N. Y.
ROBERT TAPPAN, ARCHITECT



BARRICADE DURING CONSTRUCTION OF ADDITION TO JAY'S, BOSTON



STREET FACADE

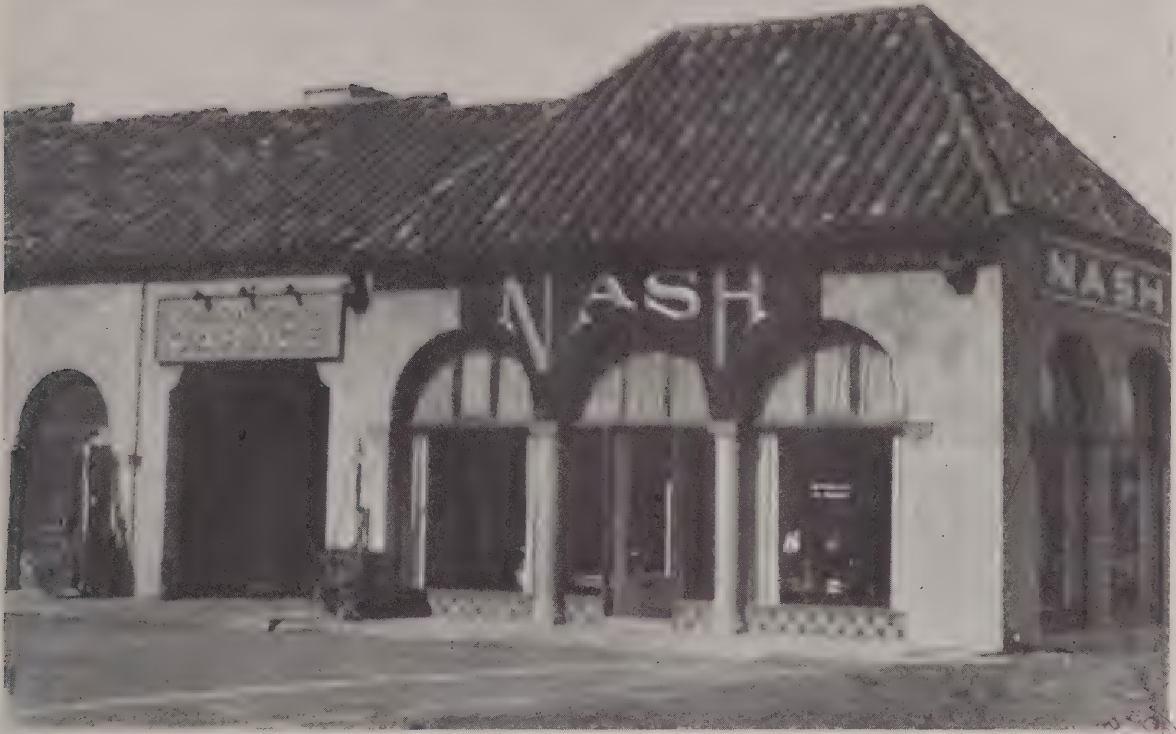


Photos. George Haight

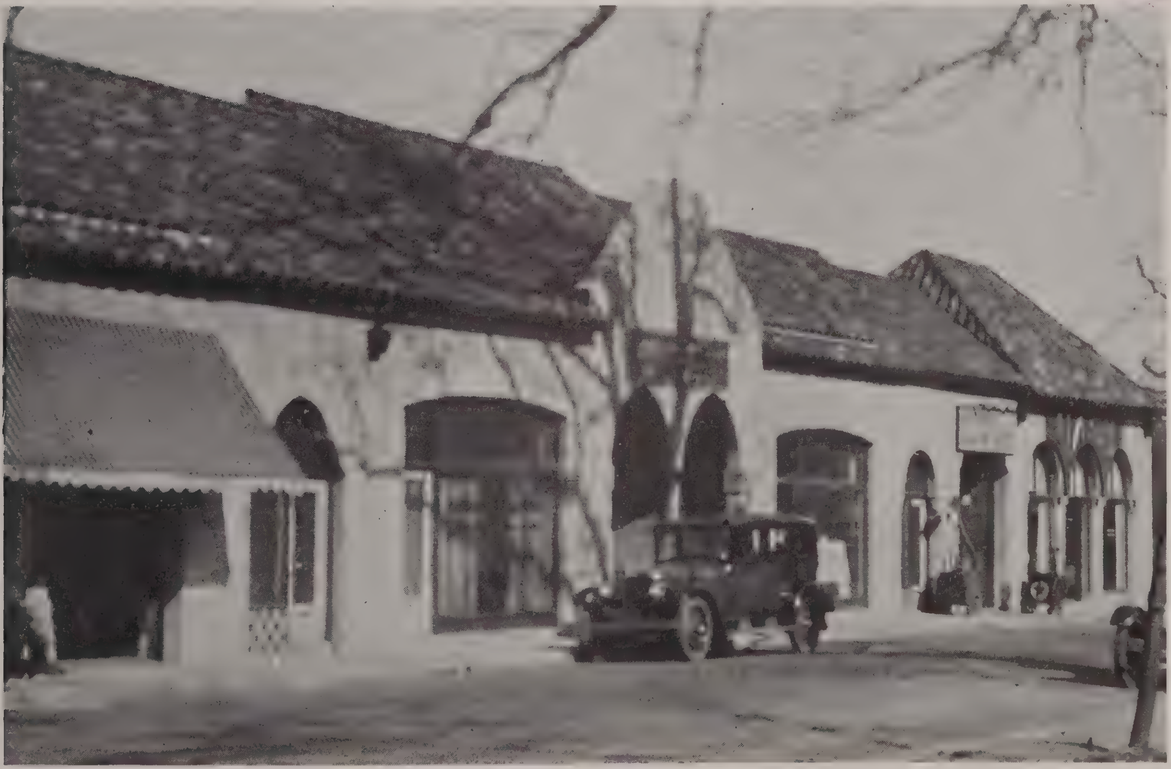
COURTYARD

PASADENA ARCADE BUILDING

MARSTON, VAN PELT & MAYBURY, ARCHITECTS



END OF STORE

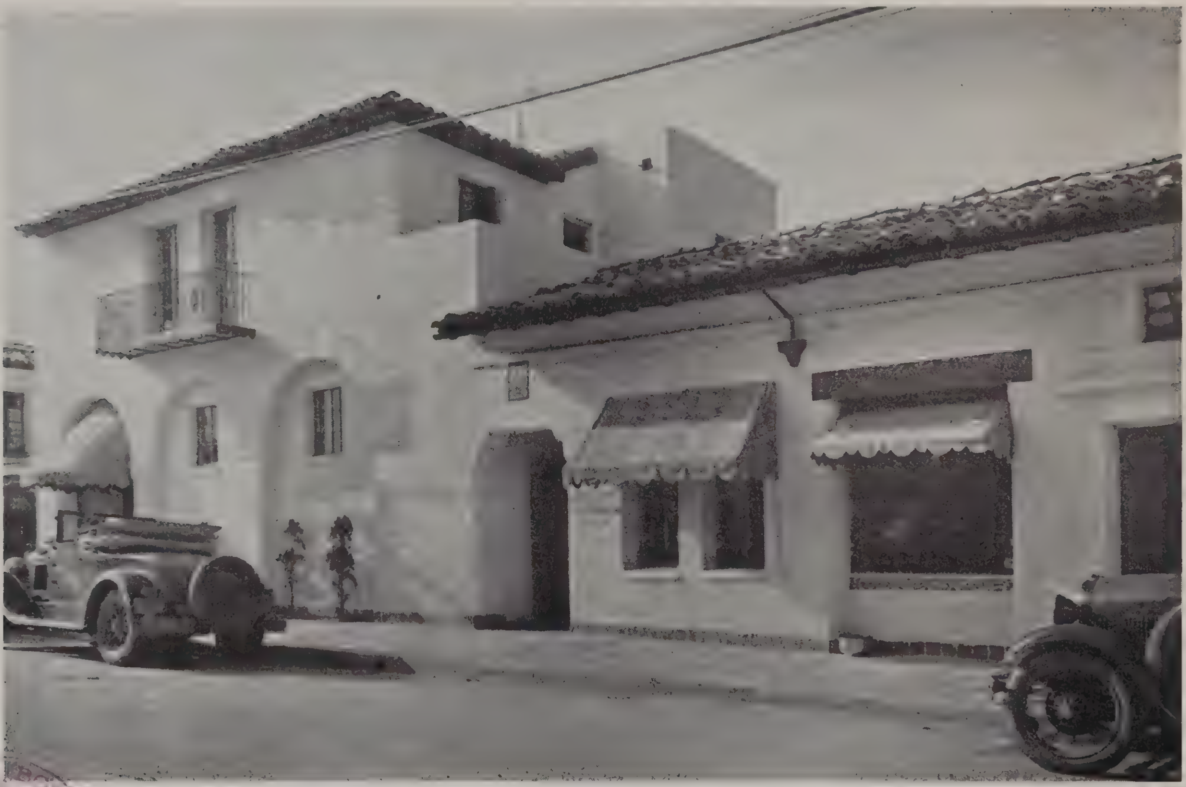


Photos. George H. Van Anda

GENERAL VIEW

STORES IN STATION PLAZA, LARCHMONT, N. Y.

E. D. PARMELEE, ARCHITECT



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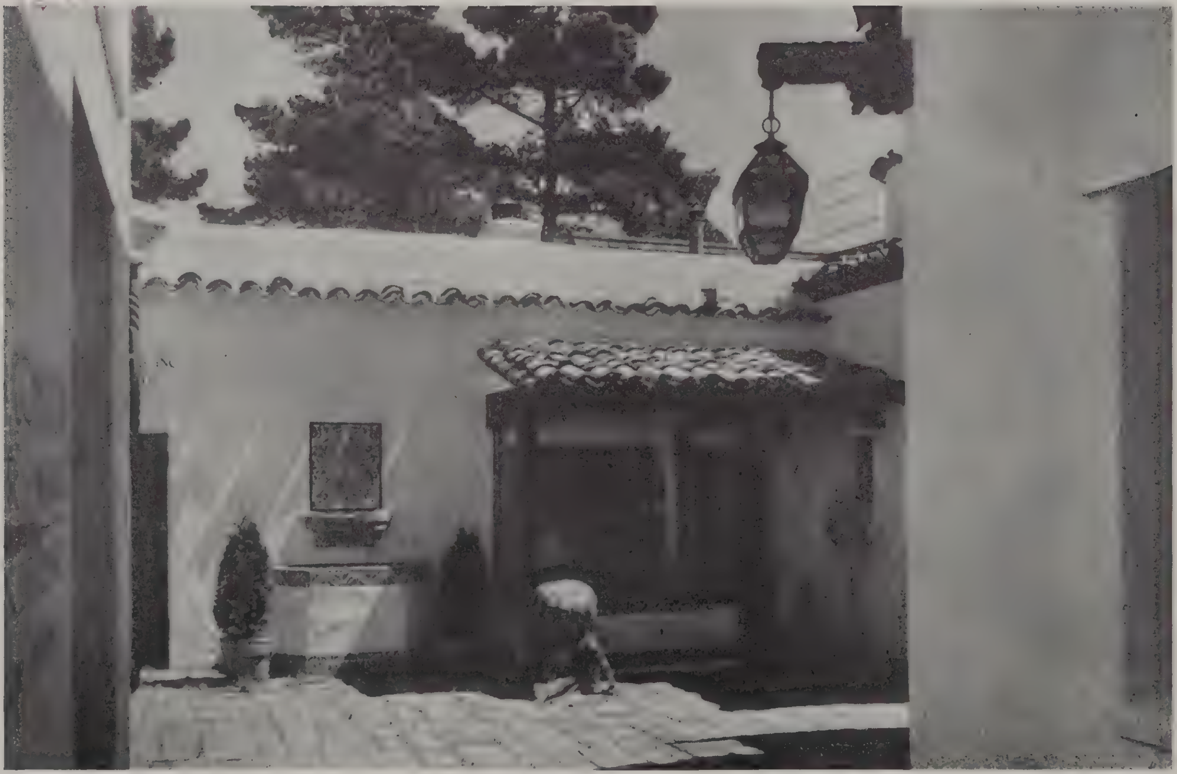


Photos. Roger Sturtevant

COURTYARD

EL PASEO BUILDING, CARMEL, CAL.

BLAINE & OLSON, ARCHITECTS

SMALL PARISIAN SHOP FRONTS

BY

LEIGH FRENCH, JR.

THE French, as a people, are probably the most conservative in the world. If one probes a little beneath the surface, one will find a deep seated intolerance of change, merely for the sake of change, without some good and sufficient cause,—furthermore, some perfectly obvious cause,—to justify it. If such cause arises, then there is no hesitation. The French are, likewise, a conventional race and disposed to adhere with unflinching tenacity to any convention that has approved itself to their acceptance by its fundamental sanity. But it must rest upon unassailable logic, or even the sanction of long usage will avail nothing; and the French are content to be both conservative and conventional. At the same time, by temperament they are strongly individualistic,—no people more so,—and they are very insistent about asserting their prerogative of individuality. Their assertion of individuality, however, is almost certain to be manifested in an ordered and logical manner consistent with the national genius; and the evidences of individuality are often marked by a distinct ingenuity working within certain restricted limits, either self-imposed or otherwise inevitably determined, which they have recognized as proper and have accepted.

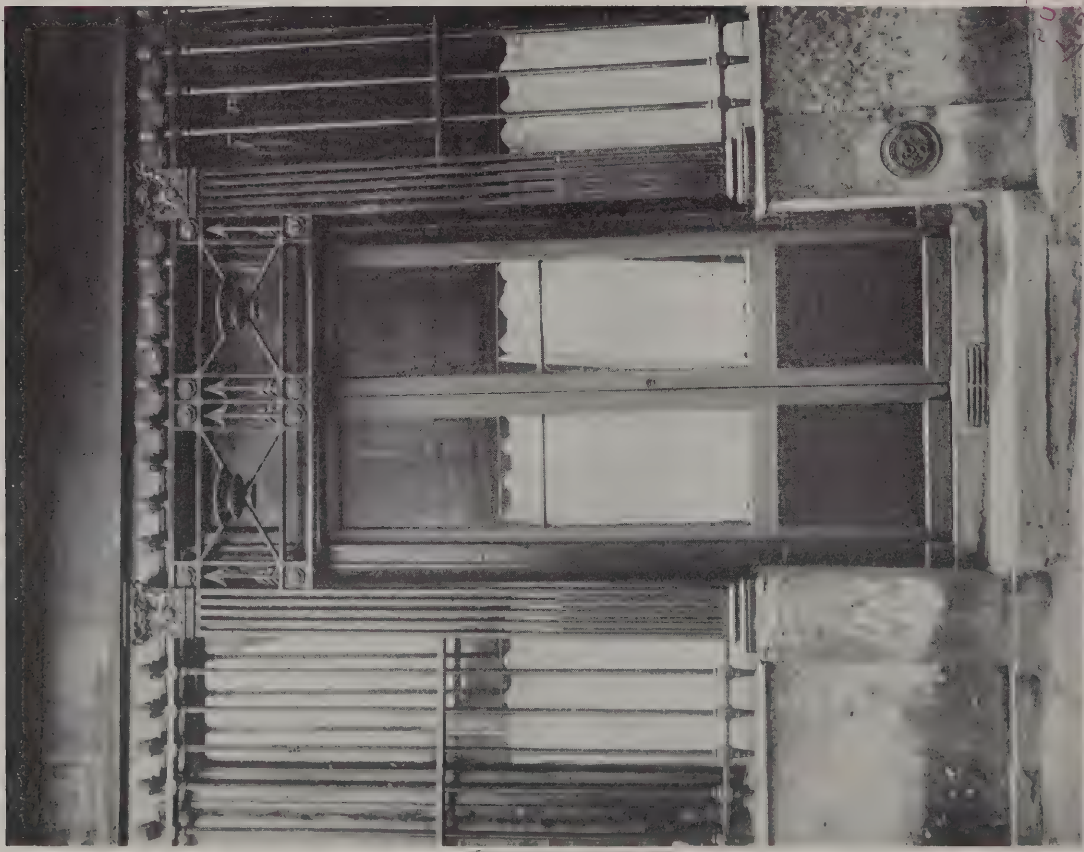
The small Parisian cabaret and cafe fronts appearing in the accompanying illustrations present a concrete example of the effect exercised by the several national traits just mentioned upon one phase of civil architecture,—a phase whose nature and function alike preclude the display of diversity and fresh invention beyond rather narrowly defined bounds. An examination of this group of shop fronts will reveal the fact that ten of them fall into one single category. Each of these exhibits a grating of iron bars extending across the whole front of the premises. This grating or screen of stout iron bars is the dominating feature of the design. In point of structure, it is what first catches and holds the eye; in point of decoration, it affords the sole opportunity of which the designer and occupants have availed themselves.

As a matter of historical fact, these iron barred fronts embody a convention which it has seemed convenient and desirable to successive generations of owners and cafe keepers to respect and preserve. They were mainly put up at about the same time,—the latter years of the eighteenth century and the opening decade of the nineteenth,—and they represented a conception of propriety that those most interested have since found no occasion to revise. It is characteristic of Latin people to bolt and bar their houses, their places of business, and all other buildings at night as securely as though they were expecting a riot or a siege. The iron gratings give structural stability and the required security. Since change for the sake of mere change has little appeal, and retention of existing conditions makes for that economy so esteemed by all Frenchmen, these barred fronts are likely to continue and please the eye.

For the most part, the shop front arrangements behind the iron gratings are altogether commonplace. Some of them might even be termed flimsy. They consist merely of the necessary doors, window lights, and the shutters that are put across the windows when the places are closed. Often no effort is made to make the inside of the window attractive, and occasionally the curtains hung at them are tawdry and give no aid to appearances, to say the least. In other words, this layer of the front counts for nothing except in a purely negative way. The "menagerie cage" grille is the one and all-important part of the composition so far as the general aspect is concerned.

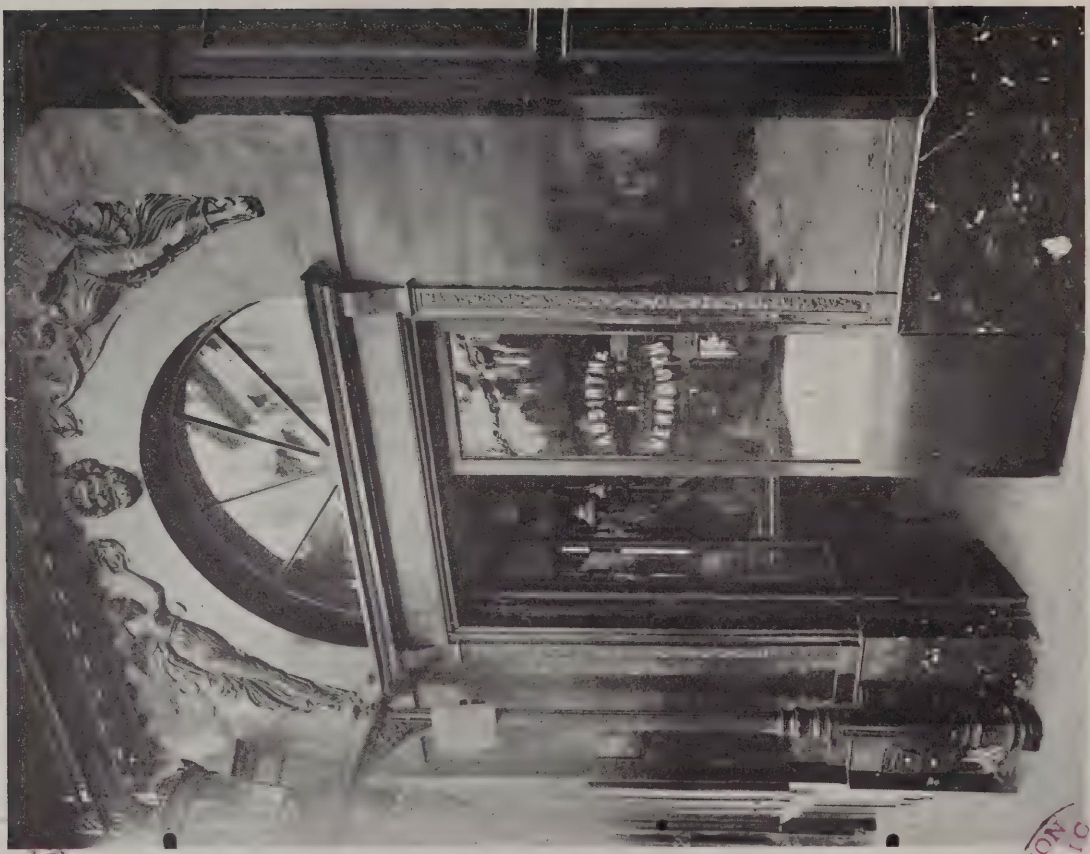
When we analyze the treatment of these iron bar fronts, it is astonishing to find within what narrow limits those responsible for their design have managed to attain both interest and individuality. In nearly every instance, the one spot where invention and the impulse toward diversity have been allowed free play is the immediate entrance. Often the area of liberty is confined to the small space immediately above the door, even the sides of the doorway being destitute of any distinguishing touch. Even when the sides of the doorway are graced by some modest accent of decoration, it is always in the limited overdoor space that we find whatever device gives the front its peculiar distinction or conveys some pertinent allusion either to the character of the business conducted or to the personality of the proprietor.

Over the door of one little establishment, known as *La Coquille d'Or,* the whole rather elaborate decorative treatment is centered in a large gilded cockleshell. Thus is served, and in a very pleasant form, the double purpose of both ornament and advertisement. The billiard salon and cafe called *Le Reveil Matin* appropriately enough displays over the entrance two cocks, wrought in high relief in cast or beaten metal, symmetrically arranged in combination with the gilded lettering. A little cabaret styled *L'Homme Arme* has an unobtrusive but interest-compelling sign in the overdoor area. A fully armed knight, holding a pike in one hand, sits on a cannon in front of which is a pile of cannon balls. Allusion to the liquid refresh-



Photos. E. Atget. Collection: Berenice Abbott

SHOP, RUE GUISARDE, PARIS



SHOP, RUE DE RAE, PARIS

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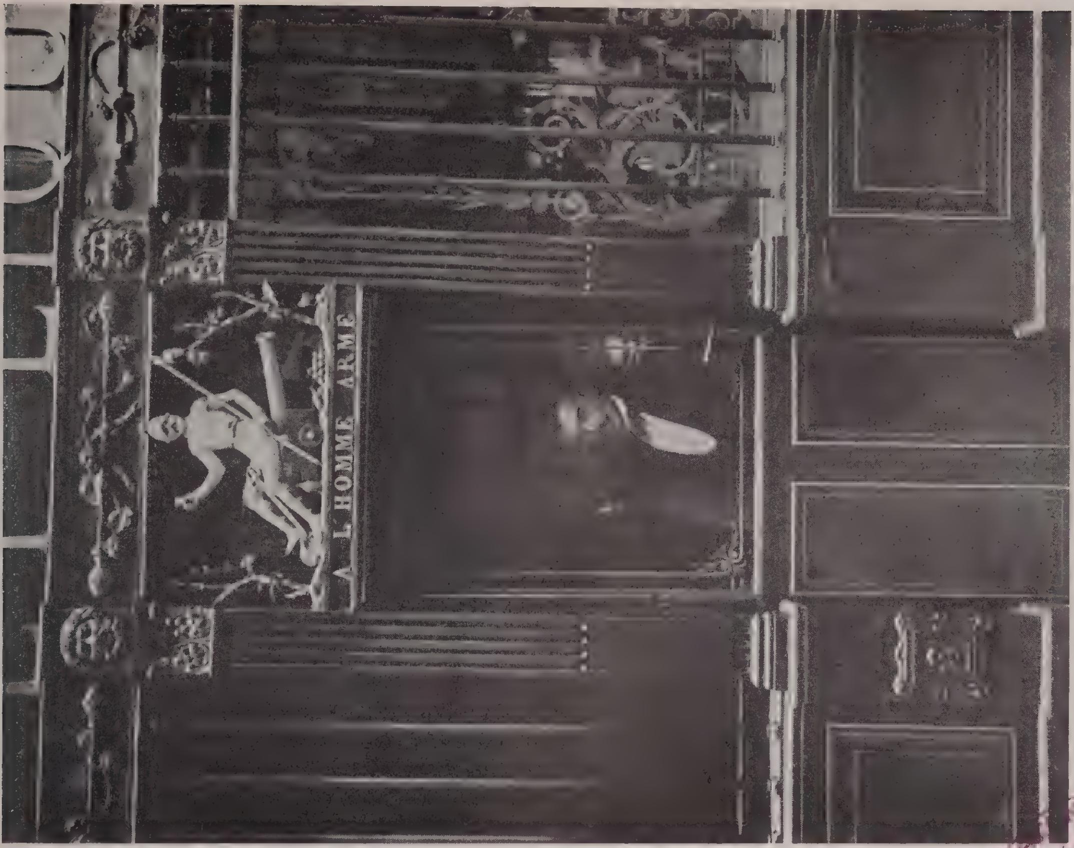

CABARET DE L'HOMME ARME, PARIS

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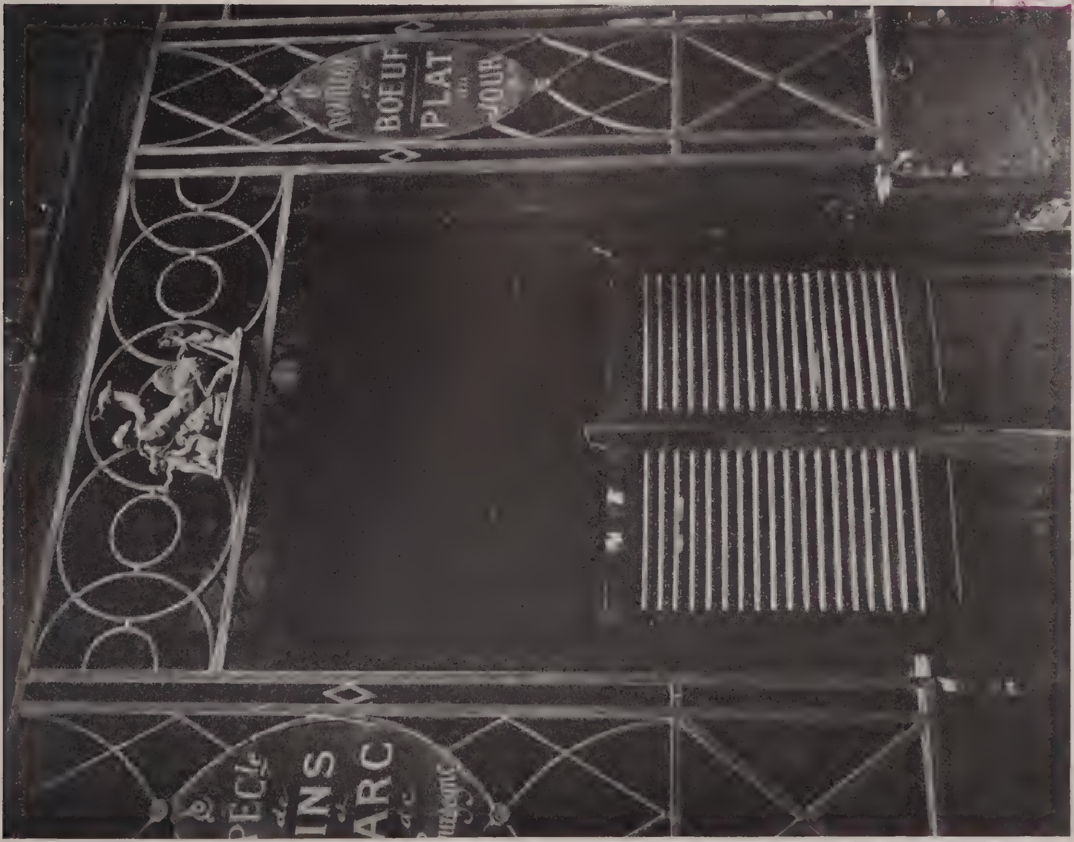
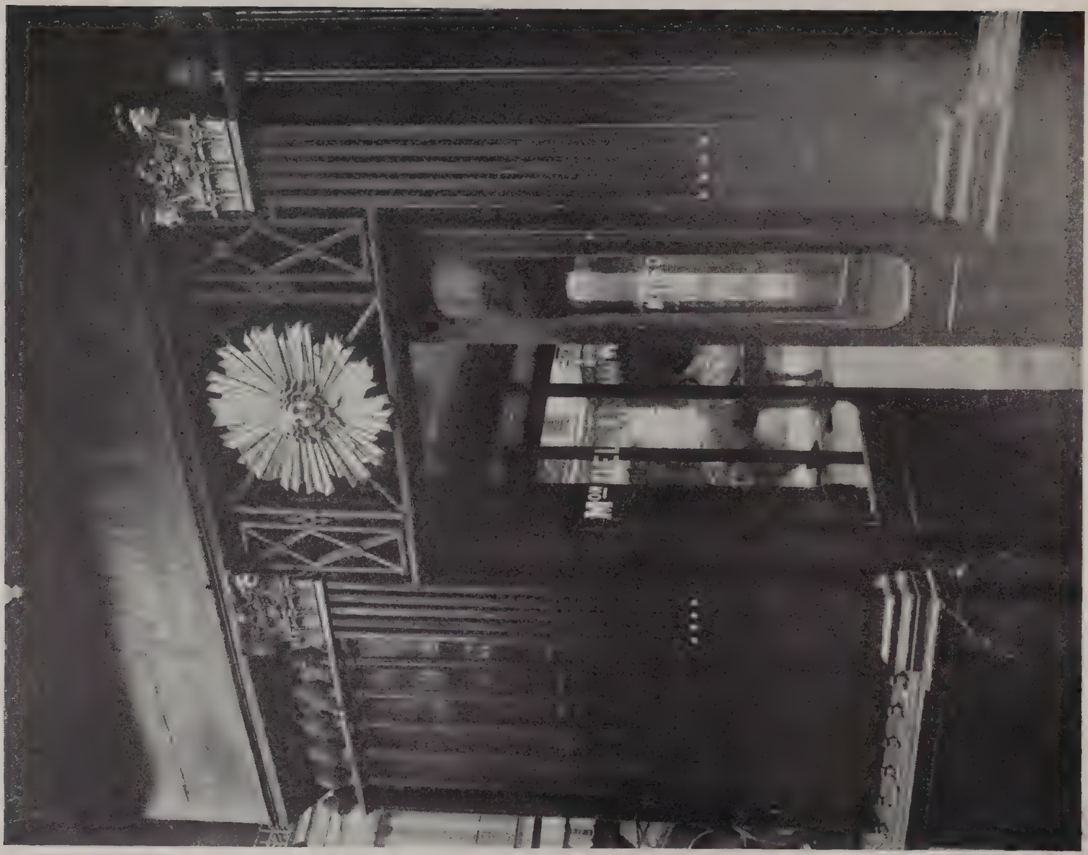
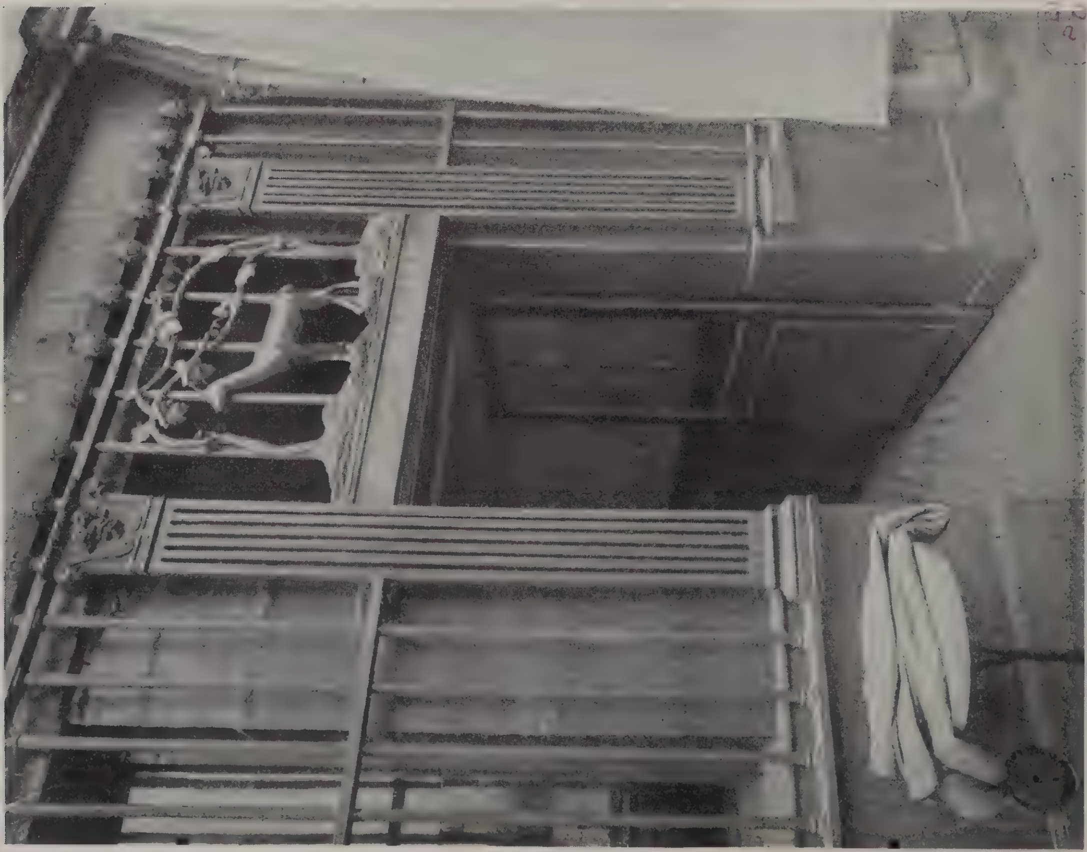


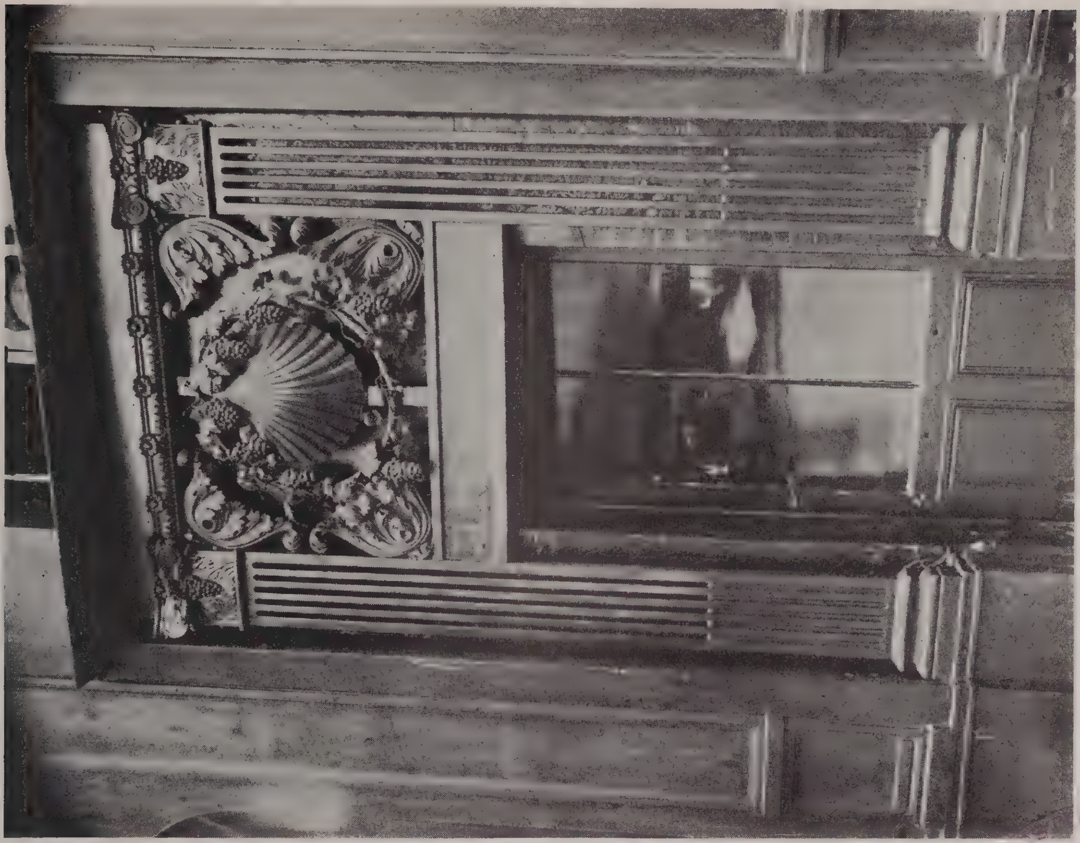
SHOP, RUE DE ST. PERES, PARIS



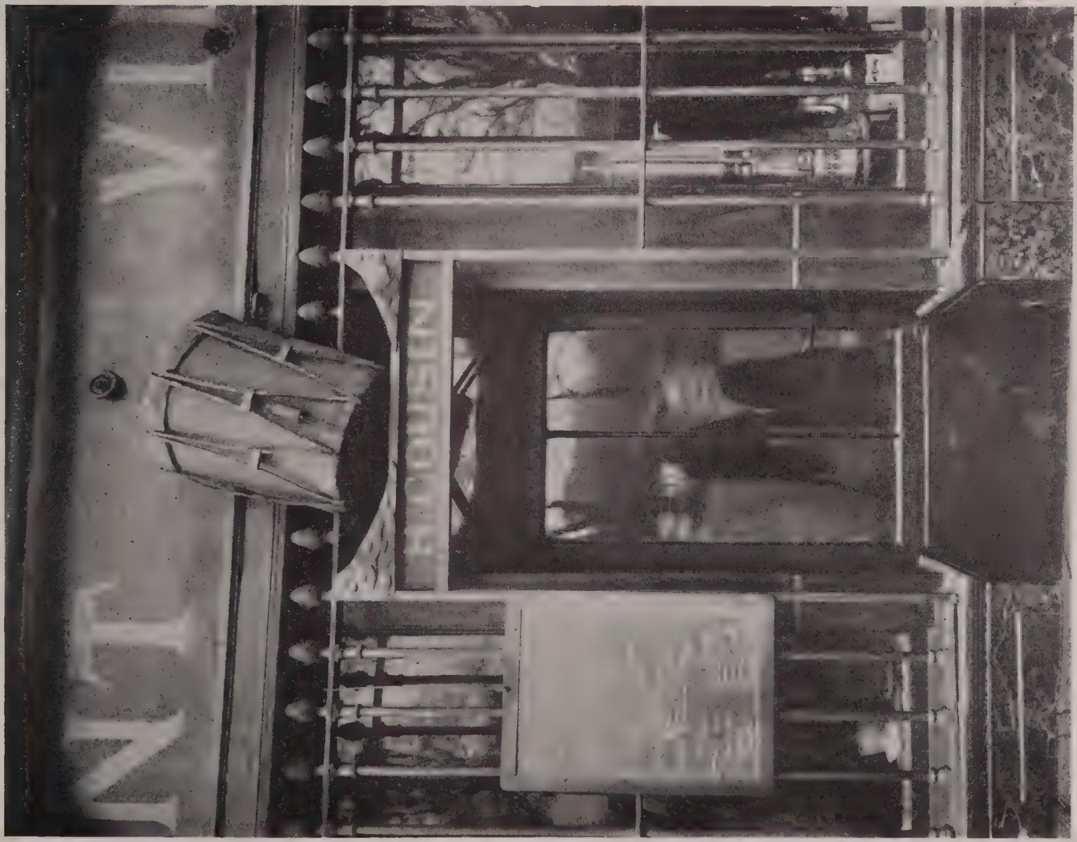
SOLEIL D'OR, PARIS



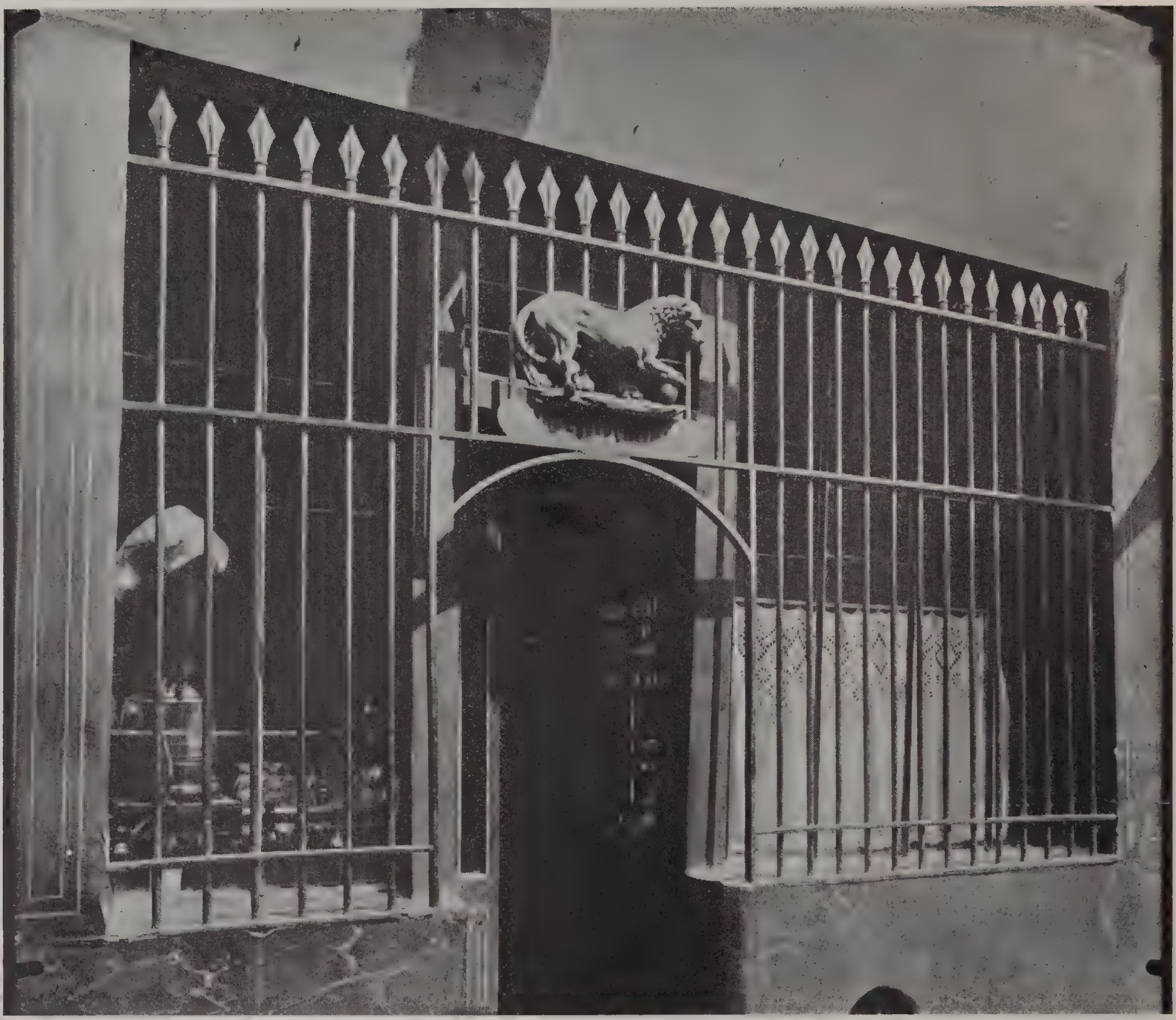
LA BICHE, PARIS



LA COQUILLE D'OR, PARIS



AU TAMBOUR, PARIS



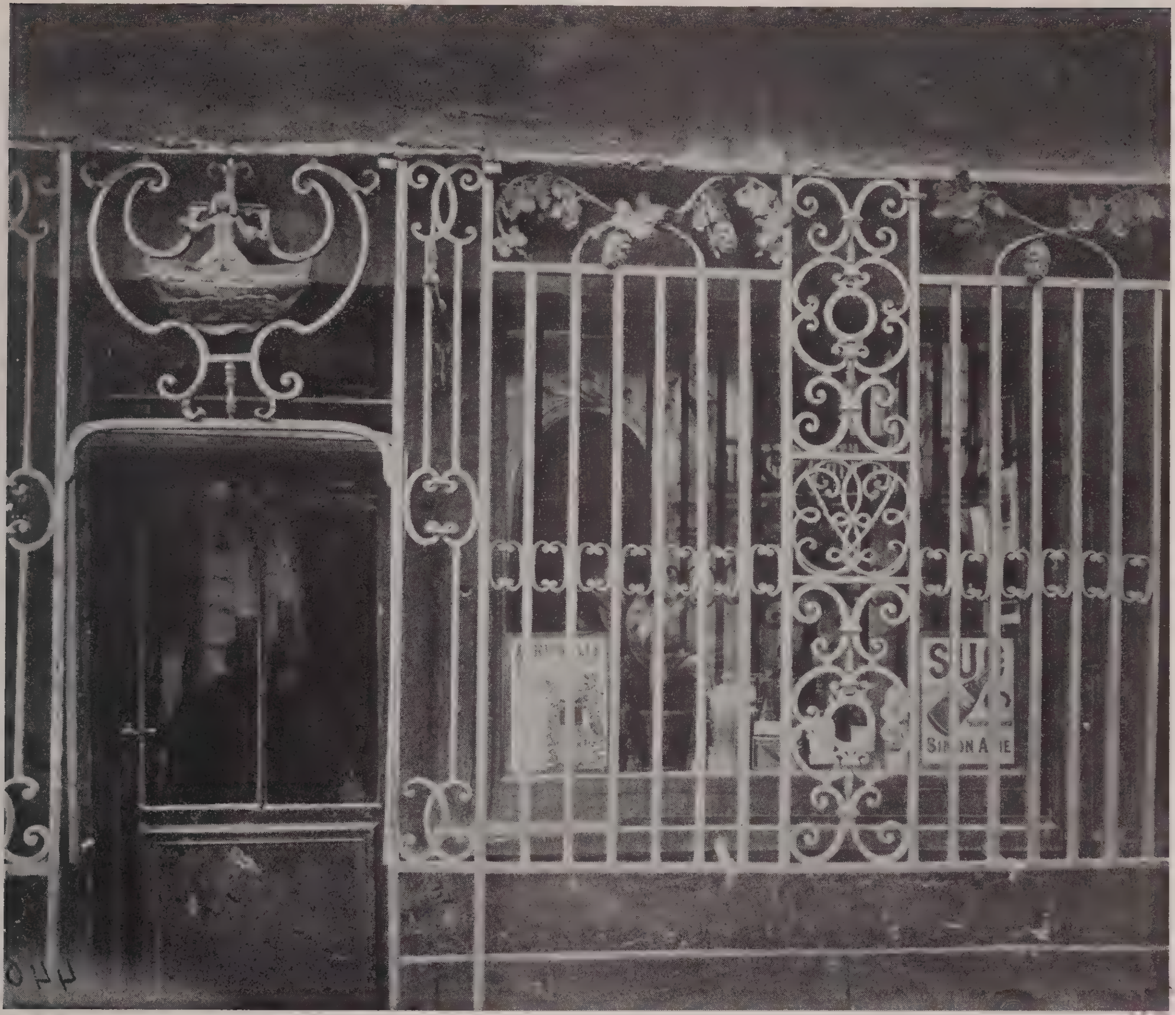
Au Lion D'Or, Paris

ment procurable within is pointedly conveyed by the brimming glass the warrior holds in his right hand, the jug on the ground beside his foot, and by the bunches of grapes hanging from the vine at one end of the composition.

The *Grappe d'Or* has a gilded bunch of grapes enclosed within a wreath of grapevine leaves attached to the intersection of two maces set above the door; deer denote the establishment named *La Biche;* a rayed and gilded sun with a mask in the center sufficiently indicates the *Soleil d'Or,* while in still another instance the type of restaurant and wineshop business carried on within the doorway over which it is displayed is unmistakably announced by the figure of a fat satyr attended by two equally fat cupids. And so goes on the story of decorative symbolism in cafe design.

Apart from either the embellishment or the play of diverting fancy bestowed on the small overdoor spaces, there is ordinarily very little or nothing in the composition of these fronts that can be regarded as contributing in any decorative way to the interest of the design. The doorway, it is true, is flanked in some cases by pilasters, but the pilasters, both actually and in effect, are but adjuncts to the central overdoor motif, enclosing it between their shafts and affording clearly defined boundaries. The capitals of these pilasters are frequently treated with great freedom and made to contribute to the general allusive purpose of the decoration. For example, the capitals of the pilasters on the fronts of the *Coquille d'Or, La Biche,* the *Soleil d'Or* and *Le Reveil Matin* all show a wide departure from classic precedent in the bunches of grapes that form conspicuous features of their composition and coincide with the symbolic intent of the rest of the ornament employed. The grapes, indeed, quite dominate the situation and thrust the acanthus leaves into a secondary place. Gilding, judiciously applied to certain parts of the iron ornament, heightens the interest and gives appropriate accent.

The iron bars that extend across the fronts at each side of the dooways are sometimes completely

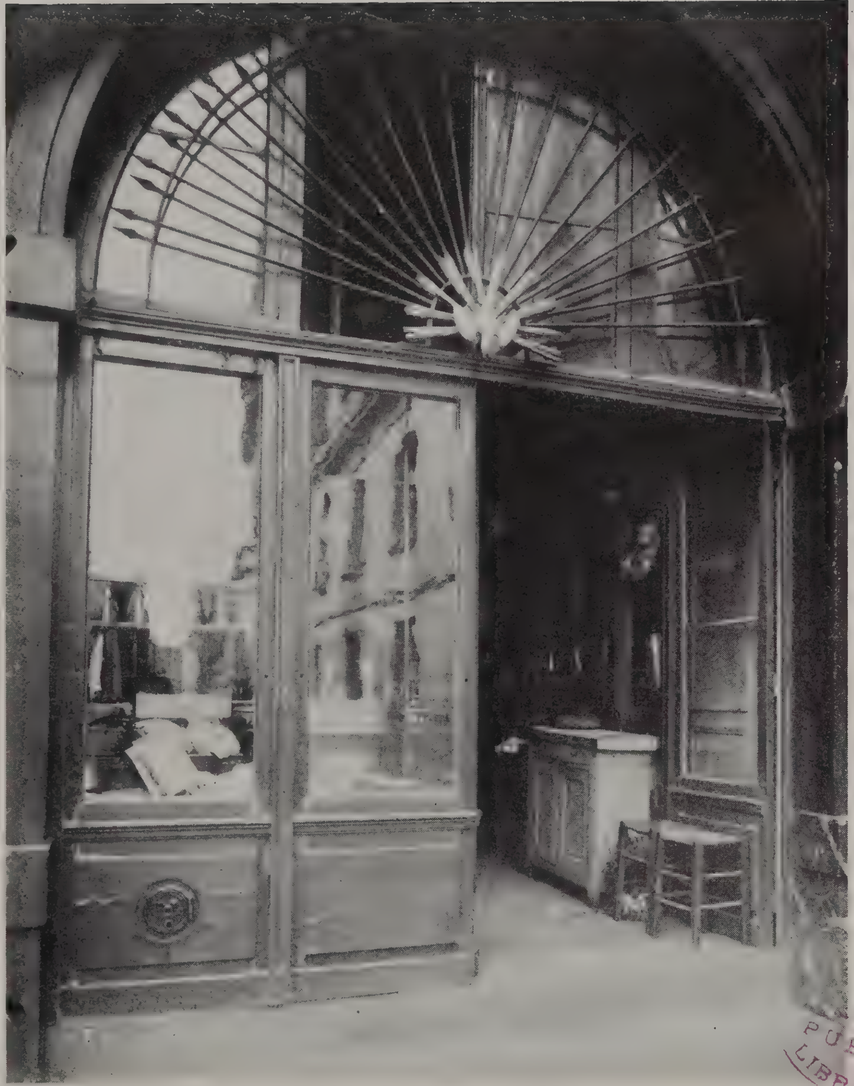


121 Rue Montmartre, Paris

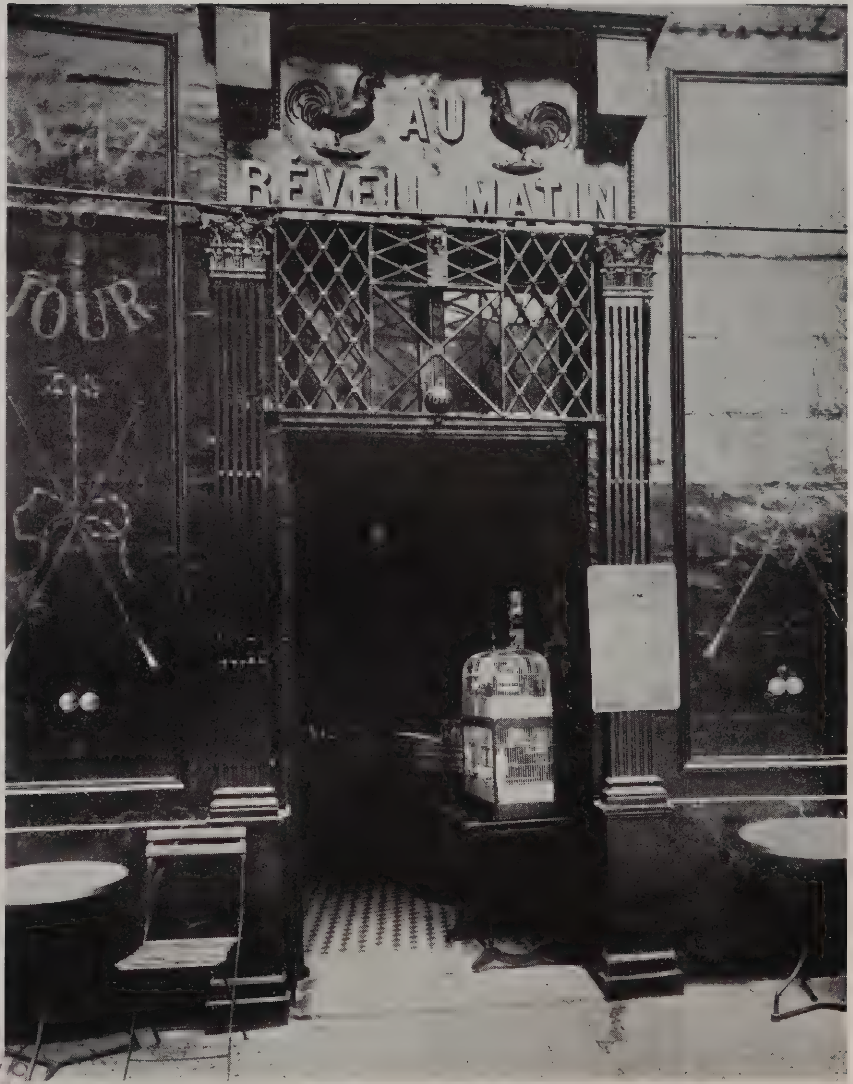
devoid of any trace of adornment. Again, they terminate above the top rail or crossbar in robust pine cone finials, and occasionally they display a simple moulded base and an equally simple moulded necking just below the top rail. Javelin heads now and then appear in place of the usual pine cone, while in the fronts of *L'Homme Arme* and the *Grappe d'Or,* the plain bars terminate in the most reticent of moulded tops and bases without either javelin heads or pine cones.

Two of the grated fronts illustrated here vary the sameness of the vertical iron barring by introducing panels of a more decorative quality. One of the fronts has narrow wrought end panels, incorporating combinations of "C" scrolls, and a broad middle panel made up of "C" scrolls, circles and an interlacing monogram; across the middle of the straight barred areas is a horizontal course of opposed "C" scrolls, while at the tops, by way of a frieze, are wrought iron devices of vines and grapes. The other front offering a panel variant to the straight vertical barring exhibits a pleasant geometrical Directoire device consisting of circles,—both concentric and interlacing,—lozenges, ellipses and diagonals. Of the fronts where vertical bars do not appear at all, one of the most agreeable occupies the narrow space made by truncating the acute angle of a building at the junction of two streets. A round arched opening has a boldly modeled human mask above it.

The typical Frenchman instinctively thinks in a clear, orderly and direct manner. In thought and action alike, he makes straight for the end in view without allowing himself to be diverted by irrelevancies. Americans abroad have the same tendencies, and easily succumb to the lure of cafe and cabaret fronts. Therein lies the essence of style in the abstract. None of these fronts that we have been analyzing sparkle with newness. Some of them have fallen into an obvious state of shabbiness; but they all have style, and it is because of the style arrived at, as a result of the mental attitude already noted, that they have all preserved a convincing quality despite their age.



CABARET, RUE DE MONDOVI, PARIS



AU REVEIL MATIN, PARIS

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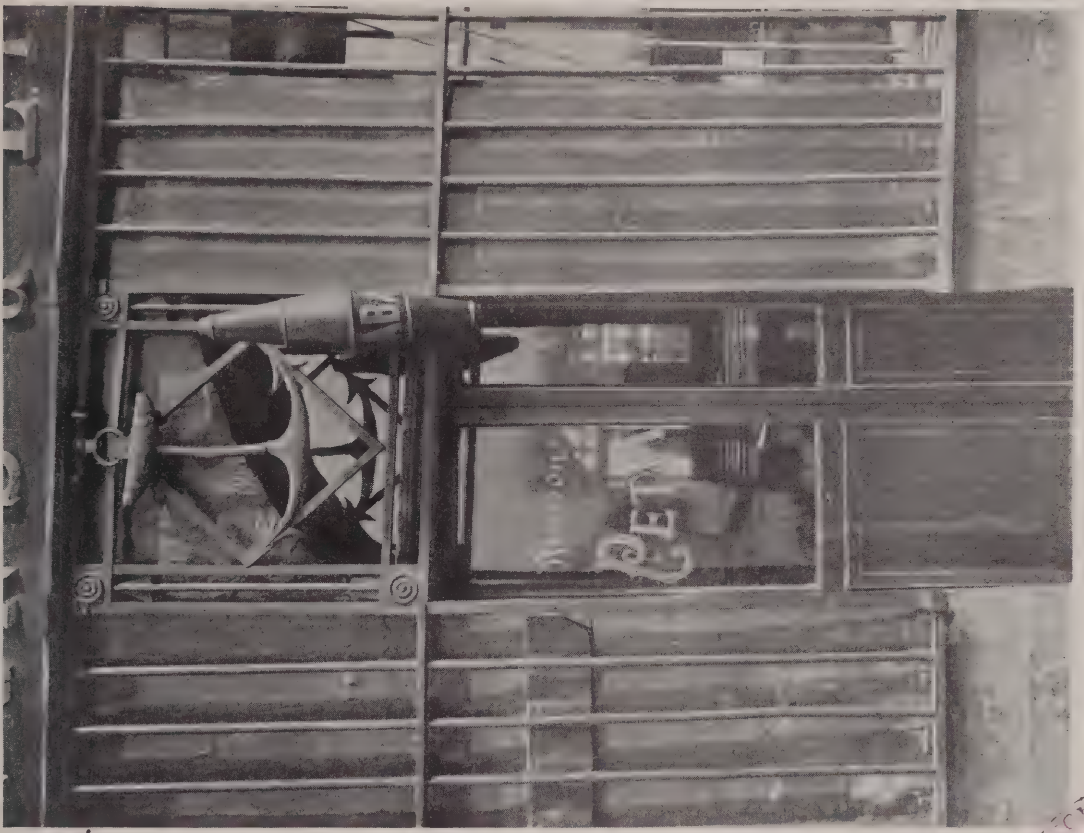
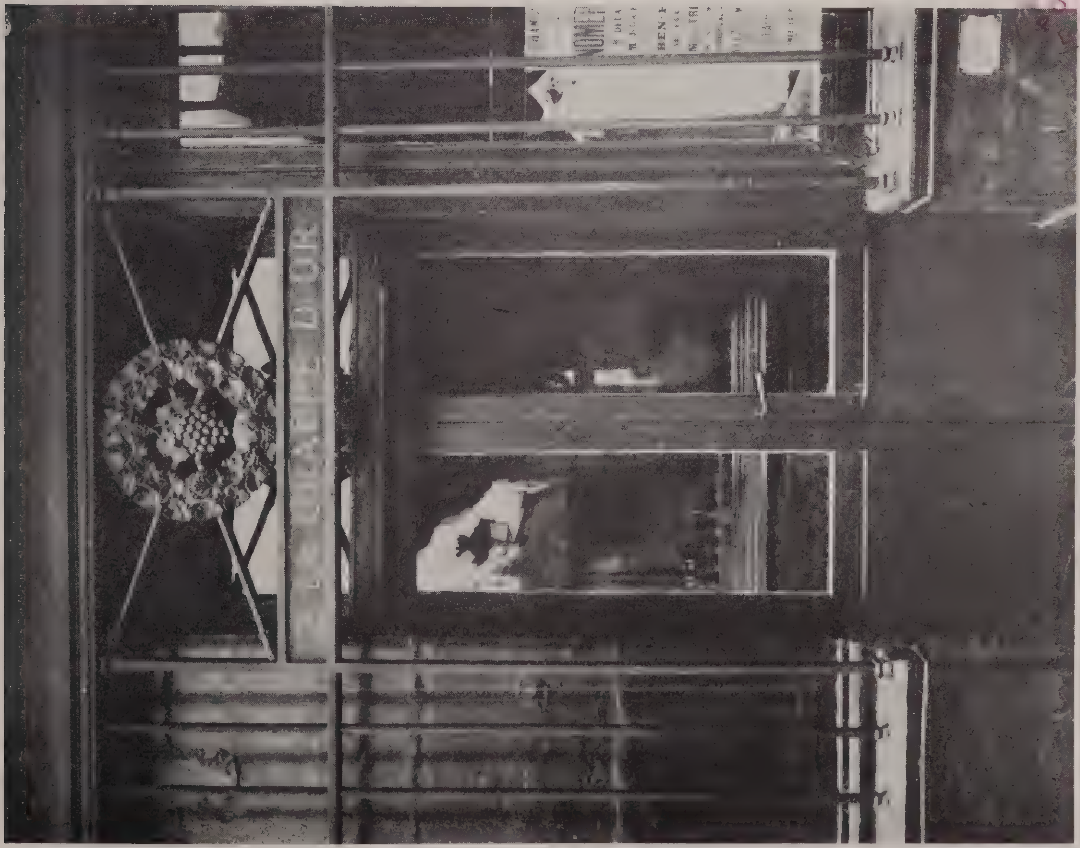
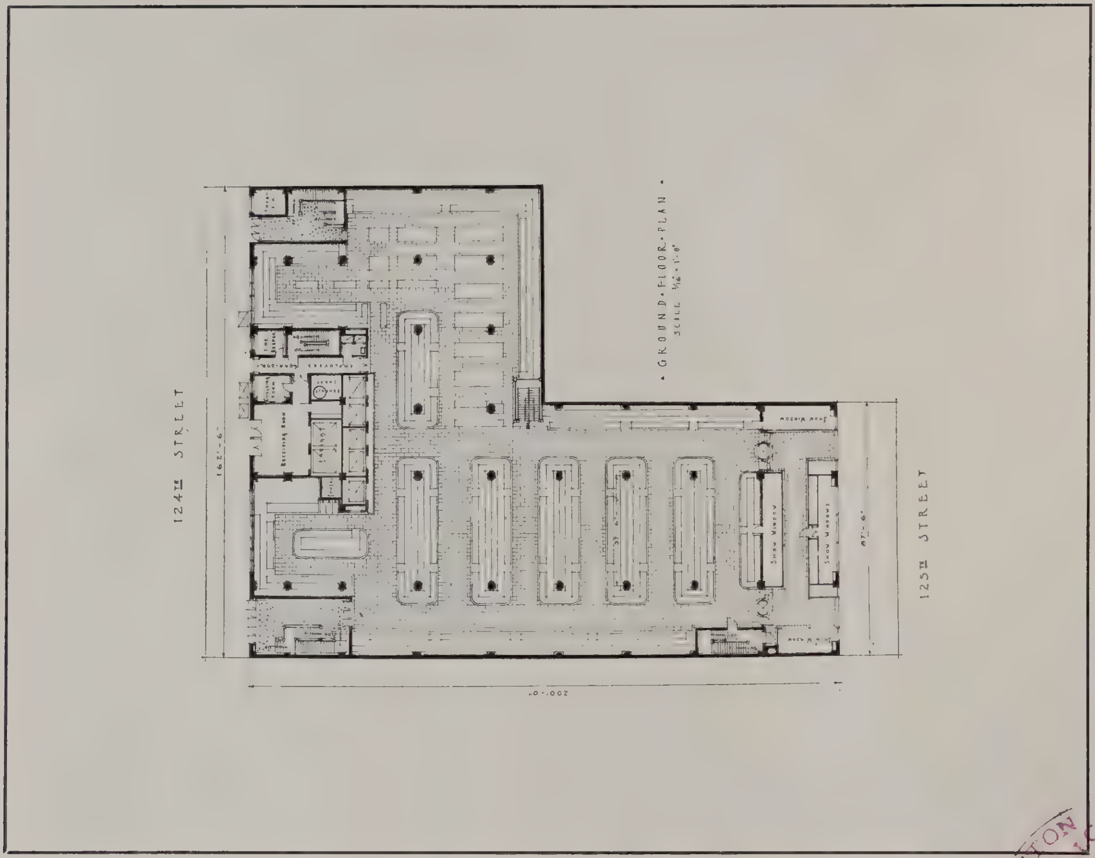
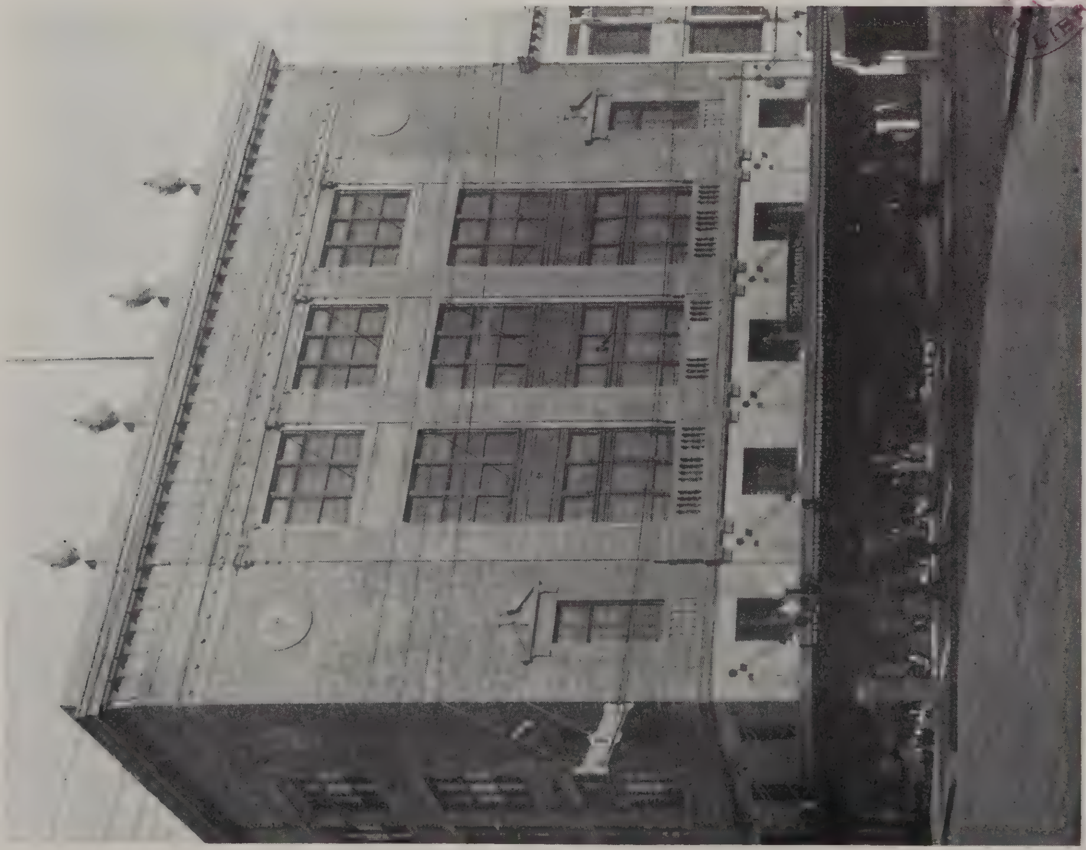


CABARET, QUAI DE BETHUNE, PARIS



LA GRAPPE D'OR, PARIS





GENERAL VIEW AND DETAIL DRAWING, TEXAS STREET ELEVATION
FEIBLEMAN STORE, SHREVEPORT, LA.
JONES, ROESSLE, OLSCHNER & WIENER, ARCHITECTS

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A NEW YORK PERFUME SHOP

PAUL CHALFIN, ARCHITECT

BY
JOSEPH MERMAN

AT the Fifth Avenue and Fifty-eighth Street corner of the Savoy-Plaza is the new Lentheric perfume shop. As soon as one enters, the strong will of the architect is felt. The expression of the room announces a clearly defined purpose. Walls and ceiling in an arrangement of gray and silver give a distinct atmosphere. In niches along the wall stand low pedestal tables flanked by torch-like lighting fixtures which rise, powerfully erect, from the floor. Everyone perceives how much the architect has allowed the perfumes themselves to dominate the picture. By means of lighting, the clear, joyous colors of the perfume containers become almost magical in their effect. The impression is heightened by the sheen of metals and the choice of a contemporary mode of decoration. Two ornamentally carved wooden pillars in a rich palisander mark the transition to an alcove likewise given a serene effect by the lighting and the use of silver. An almost invisible method of ceiling lighting gives harmony to the space. The alcove is closed by a semi-circular wall with doors on each side of a fountain on a pedestal table. Unusual powder niches in the side wall with fixtures to give daylight and nightlight effects contribute greatly to the feeling of intimacy. To the right there is a lavatory adjoining the alcove.

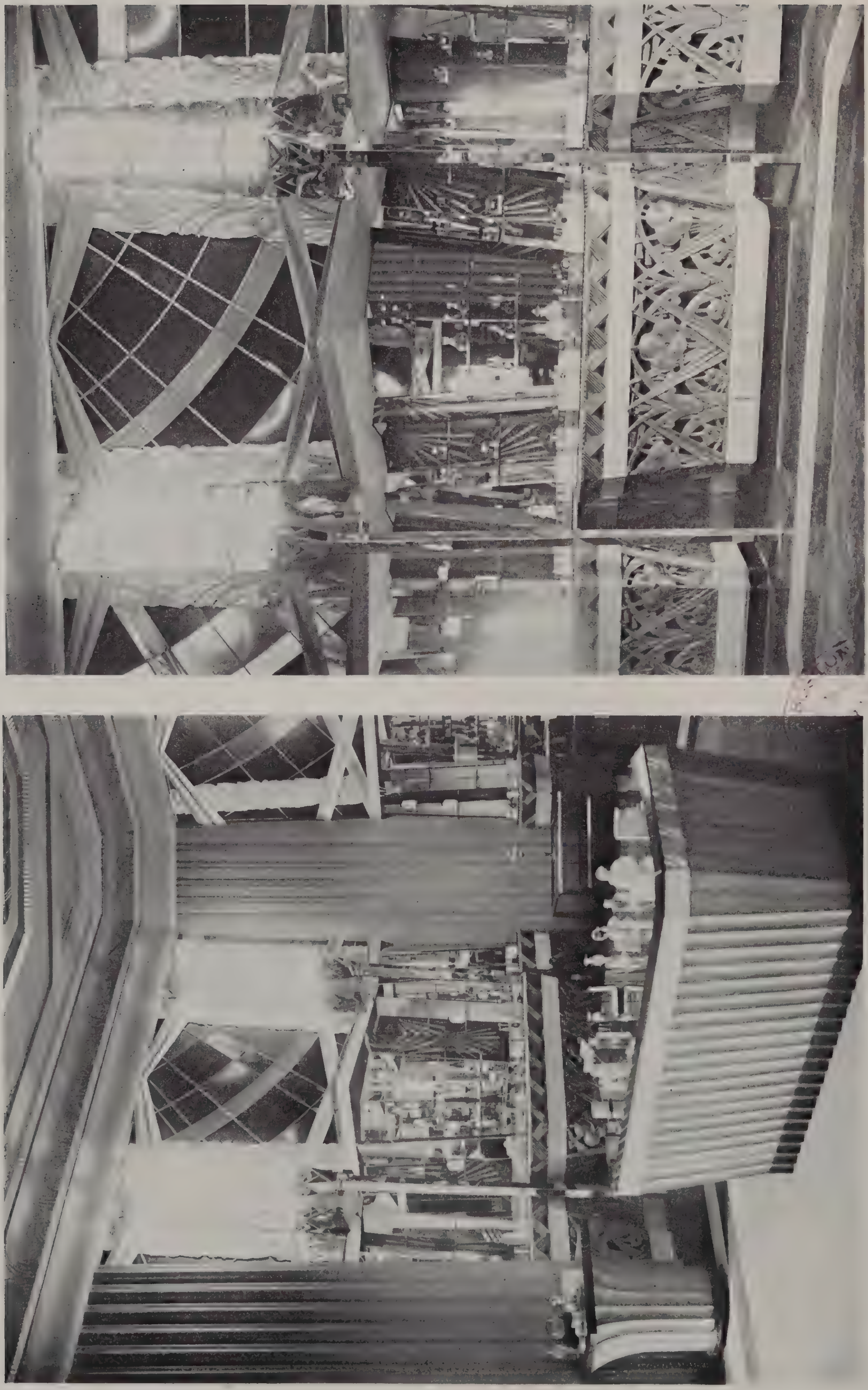
All in all, this is a superlative creation of fancy, a creation which achieves a new solution to the problem of the perfumery store. This creation is from a purely decorative point of view. The artist has rendered a conspicuous service to the renaissance of plastic interior decoration. His devotion and love of the work for its own sake is proclaimed by the refinement of his study. This devotion places Chalfin's conceptions on the plane of rarest achievement.

EDITOR'S NOTE

"The Lentheric perfume shop belongs to the group of modern stores influenced in their decoration by French practice. Mr. Merman points out the elements of the design which a German æsthete would be quickest to recognize,—the use of the bottles of perfume as a part of the decorative effect, and the enhancing of this effect through the lighting scheme. He also notes the provision of day and night lighting at the make-up tables. These two factors would have been sufficient basis for some of the more advanced German designers to create the decoration of an entire shop of this kind. Such designers would belong to the school of Gropius and Mendelsohn, to whom ornament is a factor of rapidly diminishing importance. Others would agree on the utility of creating an elaborate background, as Mr. Chalfin has done. Mr. Chalfin's choice of detail is influenced by the French. After all, American contemporary art is just beginning, and it must begin somewhere. There is little of it as yet for which the sources are not apparent. The reason for emphasizing the place of origin of the influence is that on the whole French work begins from the decorative point of view rather than from that of added comfort, convenience or utility. There are exceptions in the work of Corbusier, Bourgeois and Garnier. Which camp will gain the most, appears at present less decided in France than in Germany. Bearing this difference in mind helps an understanding of whatever work in America is based on that of either of these two movements. Moderns of such long standing in America as Wright fall less easily into these two distinct classifications. The Austrians, particularly Wagner and Hoffman, strike a medium to which Wright belongs. There are further similarities in procedure between the European moderns and those of America, notably those of Wright.

"It is doubtful if even in Paris one would find as detailed a handling as the Lentheric shop shows. The tendency in America at present seems to be highly accumulative rather than eliminative. This phase is possibly a reaction to our previous classic restraint,—possibly also an expression of the age which it will take another generation to change. We have been, and still are, busy collecting data of all kinds in a Roman manner; whether we shall take the time to arrange our material in a national form more completely than did the Romans, remains for the next generation to show. The Lentheric shop has another American quality,—that of excellence of plan. The arrangement is clear,—not crowded,—useful and logical without being baldly utilitarian. With such excellent groundwork, the fabric raised thereon could hardly fail of possessing merit."

These paragraphs were prepared for us by Shepard Vogelgesang, who also translated the first two paragraphs from the German by Joseph Merman. As no mention has been made, and as illustrations of the exterior of this interesting shop are not shown, it would seem desirable in closing to say that no actual change was made in the architecture of the facade of this shop, which is an integral part of the first story of the Savoy-Plaza Hotel, designed by McKim, Mead & White. The windows and the entrance door have, however, been treated in a modern manner by Mr. Chalfin.



LENTHERIC SHOP, NEW YORK
PAUL CHALFIN, ARCHITECT

Photos. Andrew Deane

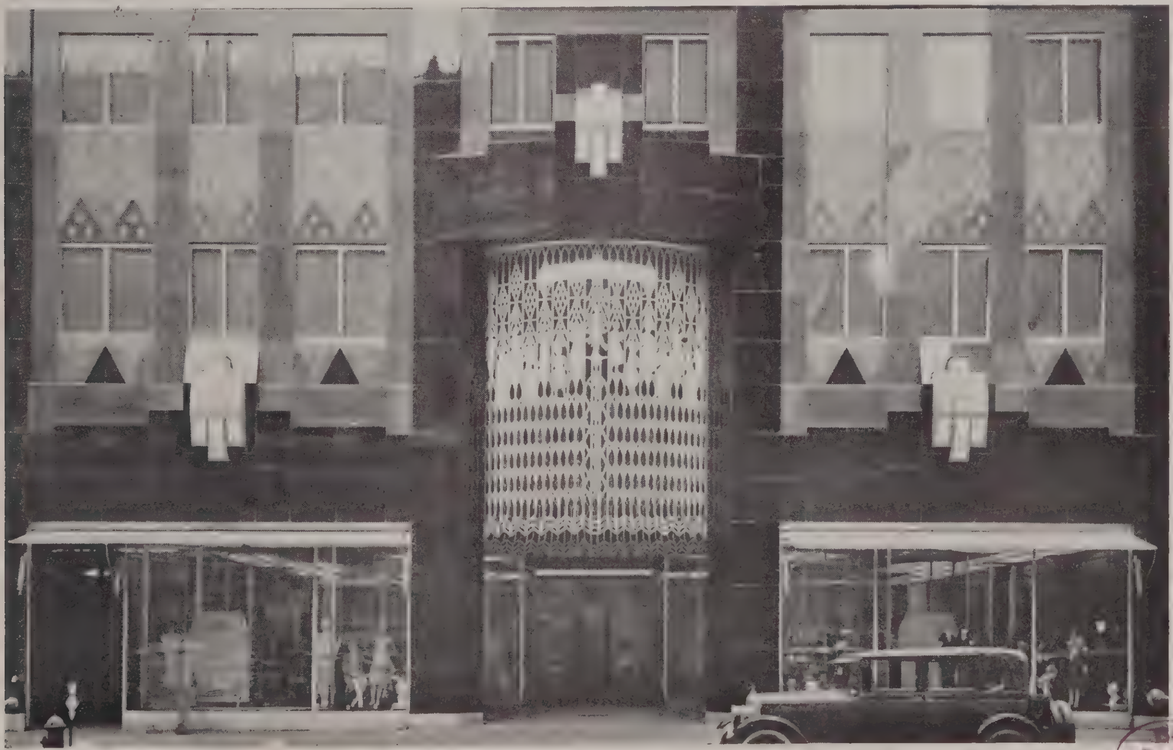
ARCHITECTURE AND TRADE MARKS

BY

SHEPARD VOGELGESANG

SINCE the completion of the American Radiator Building, architecture has been frequently spoken of as "a good medium of advertisement." More recently Fifth Avenue has exhibited examples of what might be termed "advertising fronts." When the first great Fifth Avenue stores were built, the aim was to suppress the original sign and trade mark as expressive of commercialism. Commerce took refuge in *palazzi* or retired behind columned arcades. Entering a shop was to be a romantic adventure in architecture. One walked down a street where some inflated European aristocracy seemed to dwell, but glory had already departed. Under some mighty columns and lintel one bought pretty shoes, pipes, jewels, or candy, very much as one stepped in for such things along the Rue de Rivoli or the Via Tornabuoni. Europe in the meantime built stores which in spite of a certain general ugliness were shops,—not shells vacated by a phantom aristocracy. By 1914 Vienna had store fronts which Paris in 1929 is aiming to surpass. America's return to architecture as an advertisement is due partly to the fact that business has found the Medici type a poor public attraction, and partly to the fact that many Americans were astonished by the exposition in Paris of 1925. Much of the recent work shows the French impulse. Without the impetus given by this precedent the Medici architecture would probably linger still.

The most recently completed of the new fronts in New York is that of The Bedell Company on 34th Street, designed by Joseph Urban. This facade is felt to be distinctive enough to eliminate any need of trade marks. Three stories of black glass front dominate the block wherever they are visible. In the center of the facade is a two-story rotunda in which hangs a huge silvered grille. It tells the history of the change of fashion through the last century. Three large built-in fixtures show white against the black walls; between the windows is a geometrical tracery of dull black and deep blue. Back of the rotunda there extends an arcade of show windows in broad areas of plate glass. The show cases are lighted through ceilings of diffusing glass; only the front display windows have direct light from reflectors. The ceiling is deep blue scagliola accented with silver bosses at the joints. Back of the show cases there are long slabs of the same



Photos. Sigurd Fischer

The Bedell Company, New York

Joseph Urban, Architect of Shop Front

George A. Schonewald, Architect of Building Alterations

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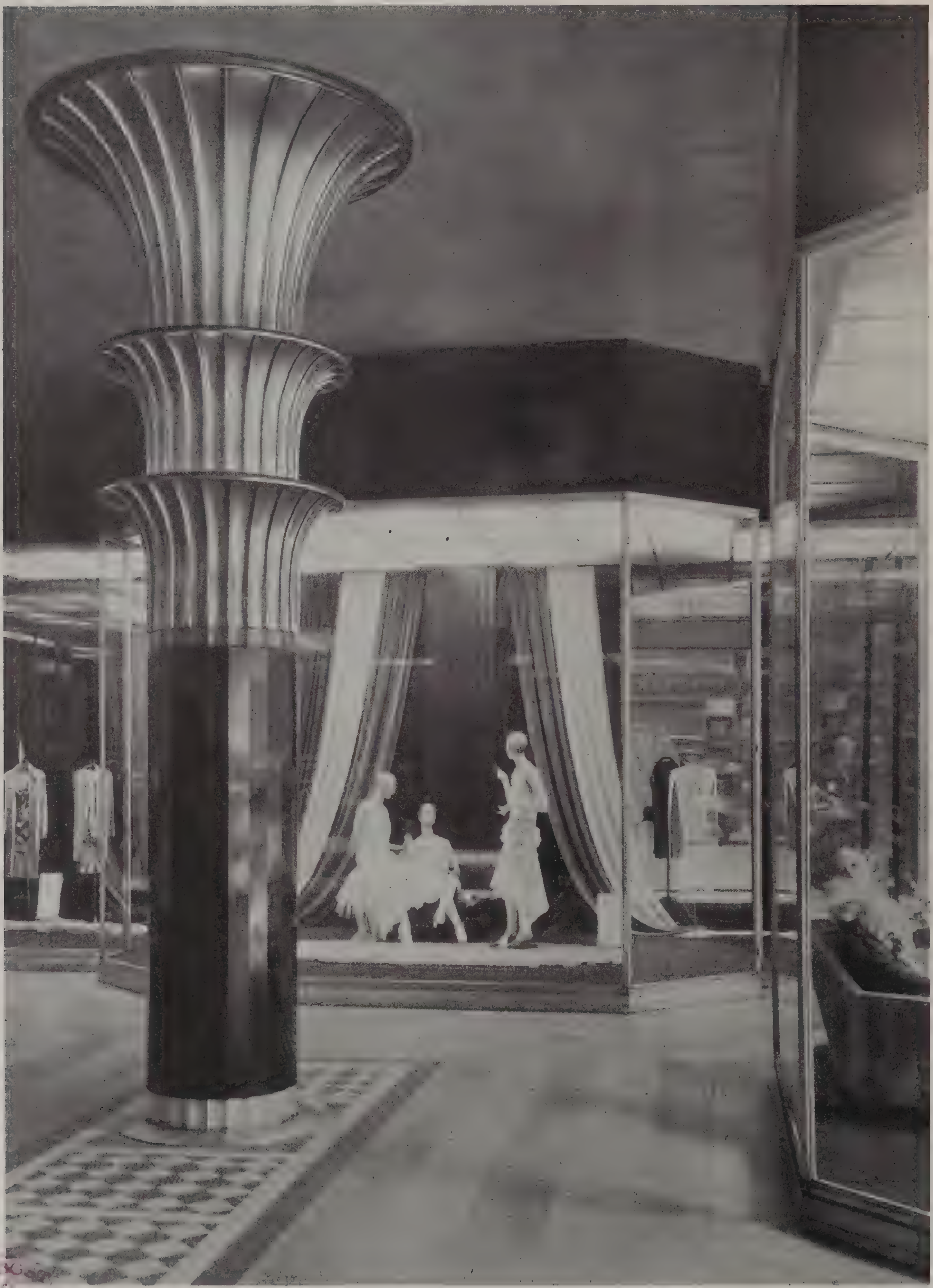

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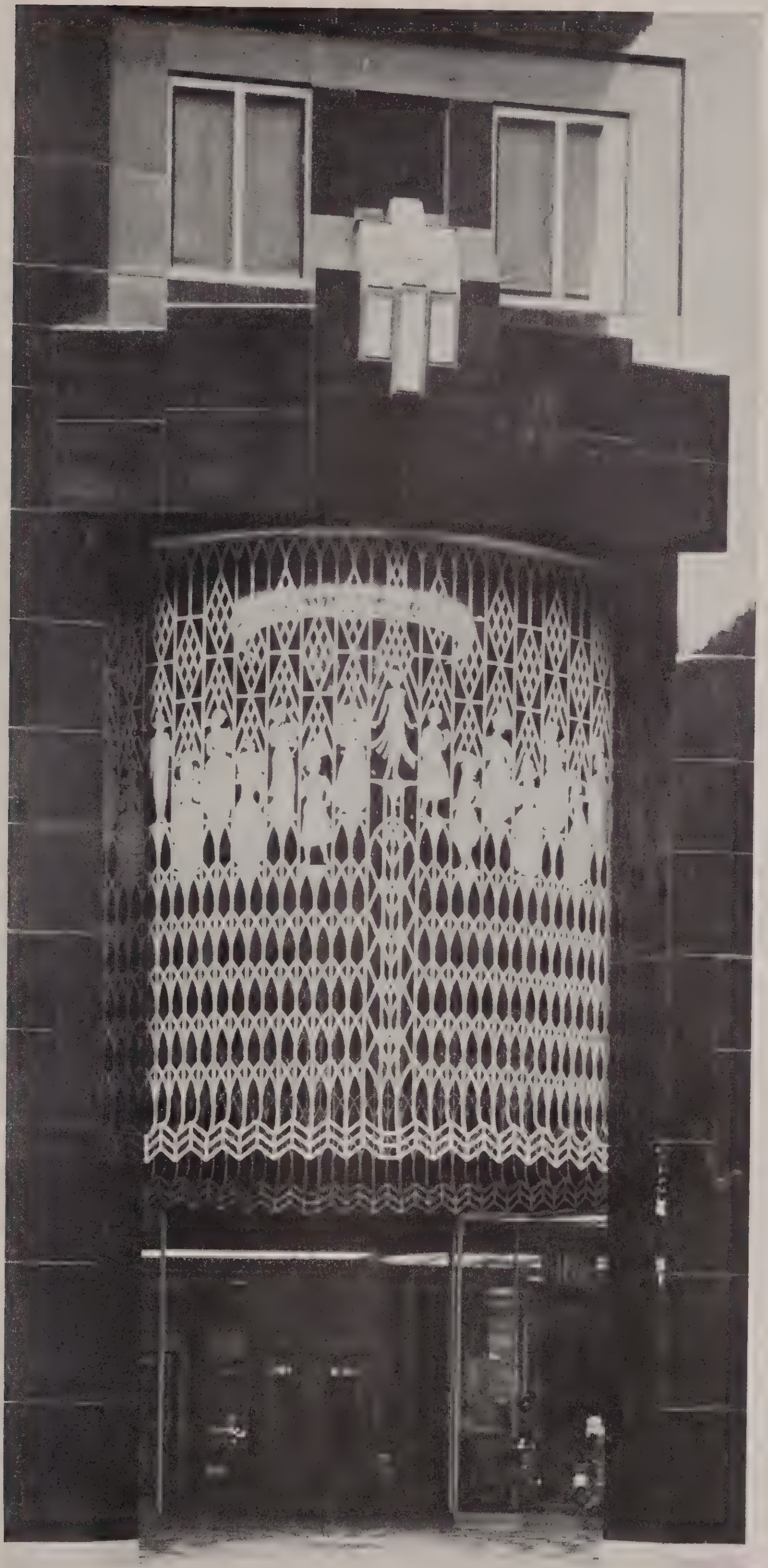
LOBBY, THE BEDELL COMPANY, NEW YORK
JOSEPH URBAN, ARCHITECT



ENTRANCE, THE BEDELL COMPANY, NEW YORK
JOSEPH URBAN, ARCHITECT

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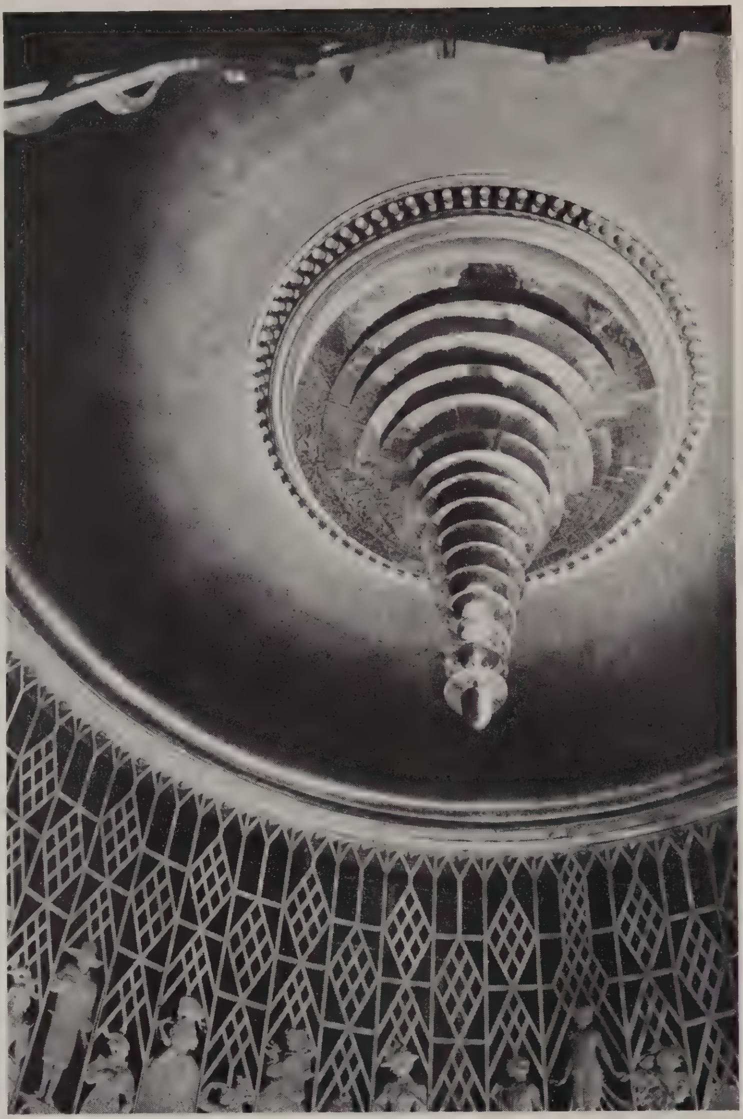


Lighting Fixture in Lobby, The Bedell Company, New York
Joseph Urban, Architect

black glass used on the exterior. Only the center slab is left highly polished; the surrounding pieces are sand-blasted in tones graded to mat black. All doors and show case frames are cadmium plated steel, as is also the rotunda grille, carrying out the scheme of blue-black and silver which is completed by the treatment of two structural piers either side of the main circulation, and these are moulded in bell forms rising one above another. The lips of the bells conceal lights which flood up the silver shaft and die out again in blue on the under side of the lip above.

In conception, the design is basically American. The shop arcade is now a much-used motif in this country. While it exists abroad, it has hitherto seldom been as much used in America. Black is used to enchance the brilliance of softly lighted displays. The deep blue ceiling gives a color variant which possesses much the same spatial quality as the black, in that both recede. To have introduced ornament and a ceiling of another color would have resulted in a "jumpy" facade and an apparent lowering of the ceiling in the arcade, which would have destroyed the present sense of great space. The entrance rotunda gives an initial feeling of ample size which one carries as an impression into the arcade. The grille functions to define this volume and to advertise the character of the store. The lighted columns were first of all structural necessities from which a rhythm of color and light are developed in the arcade,—a motif which Poelzig used in the foyers of the Grosses Schauspielhaus.

One of the innate disadvantages of the arcade treatment has not been completely avoided in Urban's handling of the problem,—that is a tendency to confusion, to lack of concentration on the objects contained in it. Much could, however, be done to overcome a scattered effect by means of the window dressing. Use of plain screens offering a warm neutral or brilliantly contrasting background to the displays might well result in a series of groups sufficiently blocked off from one another to be distinct, yet forming a succession of interesting vistas. The placing of the usual dress form displays should be sculpturesque when possible, and there exist opportunities for such an arrangement here. Just as the chief quality of sculpture lies in the fact that one moves around it instead of looking at it as with painting, so with dressed forms. Added to this pleasure there is the practical consideration that the purchaser wants to know what a dress looks like from the back!

Quietly radiant lighting is perhaps the best treatment for a public which comes to consider an expenditure. To attract attention, dramatic light and shadow effects, such as those used by Franklin Simon & Co., are excellent, but for a longer inspection they may prove distracting. In forming a judgment of a scheme, the effect upon the public should be kept in mind.

There is no longer any doubt in the mind of the shop keeper that an interesting, well designed and original shop front is a commercial asset which brings a very definite return in actual business.

THE SPANISH STORES OF MORGAN, WALLS & CLEMENTS

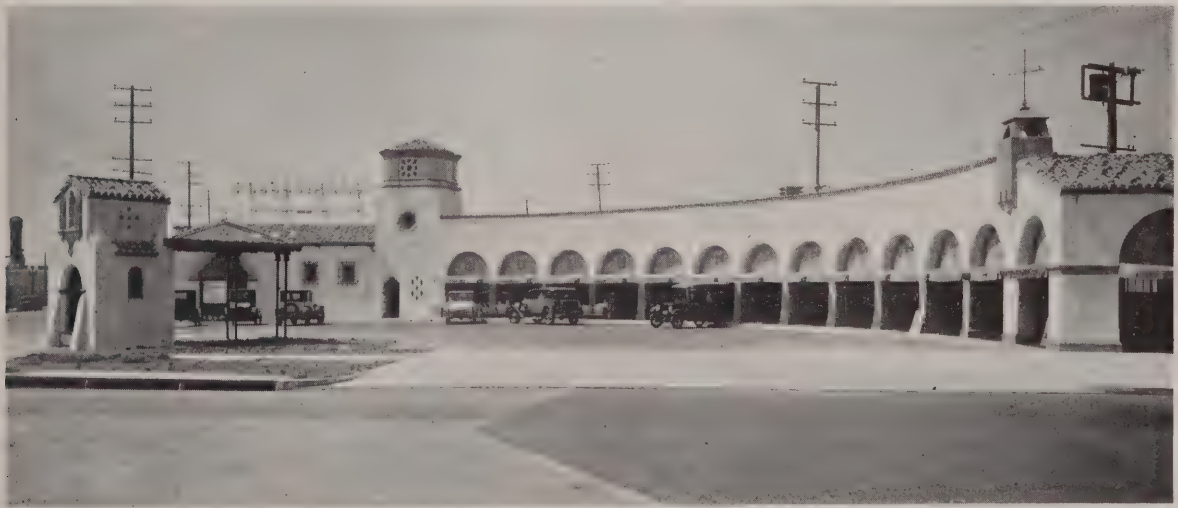
BY

DONALD E. MARQUIS

BUILDINGS of definite styles of architecture, regardless of their individual classifications, are particularly appropriate in fitting locations and surroundings. This is particularly true of the Spanish style, which was developed under the influence of a moderate climate, brilliant sunshine, centuries of a growing culture under various peoples from before the time of the Romans and through the period of Moorish occupation down to the present. When considering modern architecture in the Spanish style, we therefore are not surprised to find the examples more or less segregated in definite part of this country. Spanish architecture was introduced into southern California in the sixteenth century by Catholic priests from Spain via Mexico, who reproduced in a general way in their California missions some of the Spanish monastic buildings. True, the masonry of the buildings in Spain was supplanted by adobe bricks, but the masses and plastered exteriors are very similar. Thus the style is indigenous to this locality, satisfies climatic requirements, and although it has undergone many evolutionary changes, its character,—robust, highly colored, and rich in detail,—remains. It is also true that the Spanish style is particularly applicable to certain classes of structures, and store buildings and the smaller retail shops are happily included, along with domestic structures, in the types of buildings which are unusually effective when designed in this style.

A wide variation in architectural character will be seen to exist in the accompanying illustrations. All of them, however, show the influence of Spanish architecture of one or another of its many periods or localities. For some low buildings, where a low pitched tile roof may be used and where it is possible to secure large wall areas, the early type of very simple mass and small amount of detail, such as may be found in southern Spain, is desirable. Others will show a much more highly developed architecture, characterized by a contrast of intricate and robust detail with plain surfaces. Due to the different uses of our modern buildings when contrasted with the old, the architect is often confronted with the necessity of solving entirely new problems in the style, and thus evolutionary changes sometimes take place, and fortunate results are often secured.

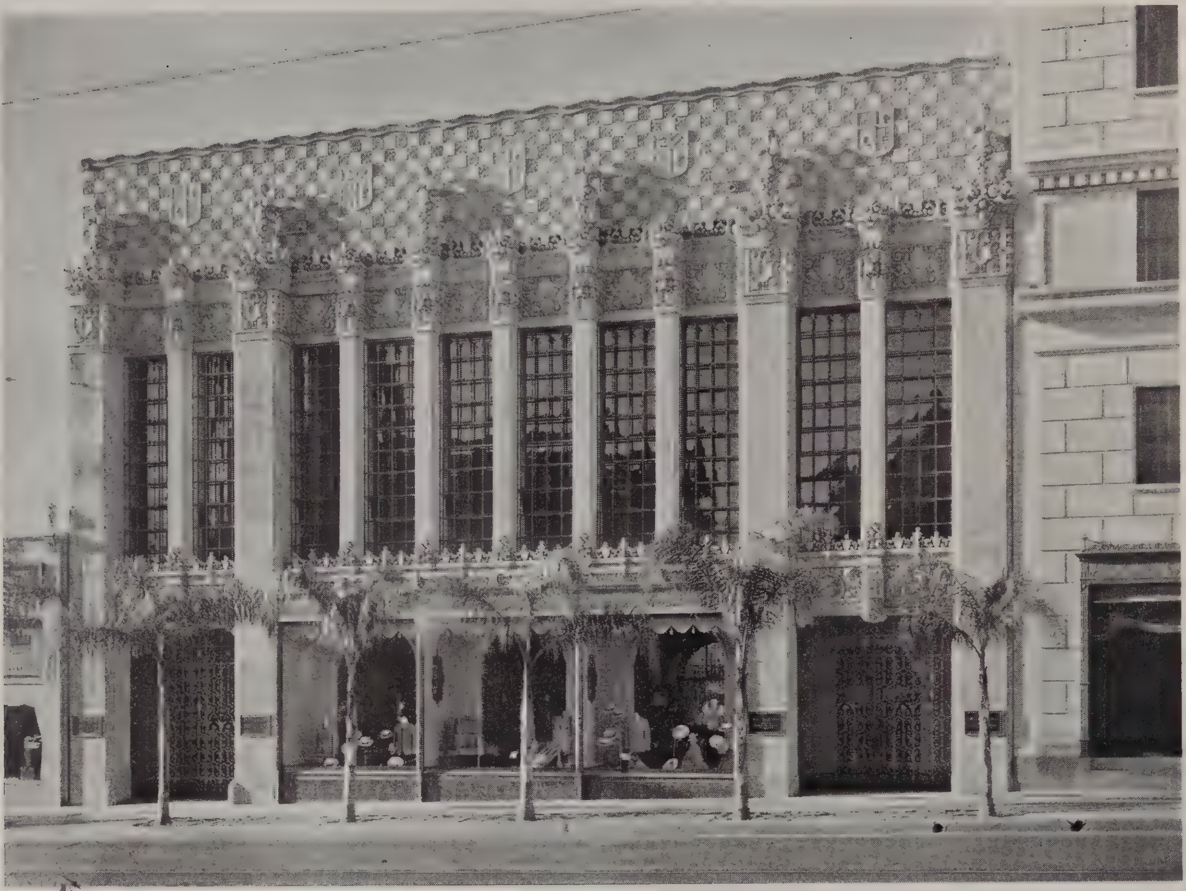
The modern store is a particular example of such a problem of adaptation, and a variety of solutions will be found, each fulfilling a special set of requirements. In general, the problem is to maintain the spirit of the style in mass and detail but to increase the area of voids materially to satisfy the demand for well lighted interiors and open show windows. During the past decade a marked change in merchandising methods in our own country has taken place. Particularly in retail stores, a great monotony formerly existed, and almost all of them were designed along stereotyped lines and had no well defined architectural character. New business methods, keener competition and the foresight of some of our more progressive architects were factors in developing new and distinctive small stores and shops. The first few designed were so eminently successful, not only from an architectural point



Photos. The Mott Studios

Plaza Market, Los Angeles

Morgan, Walls & Clements, Architects

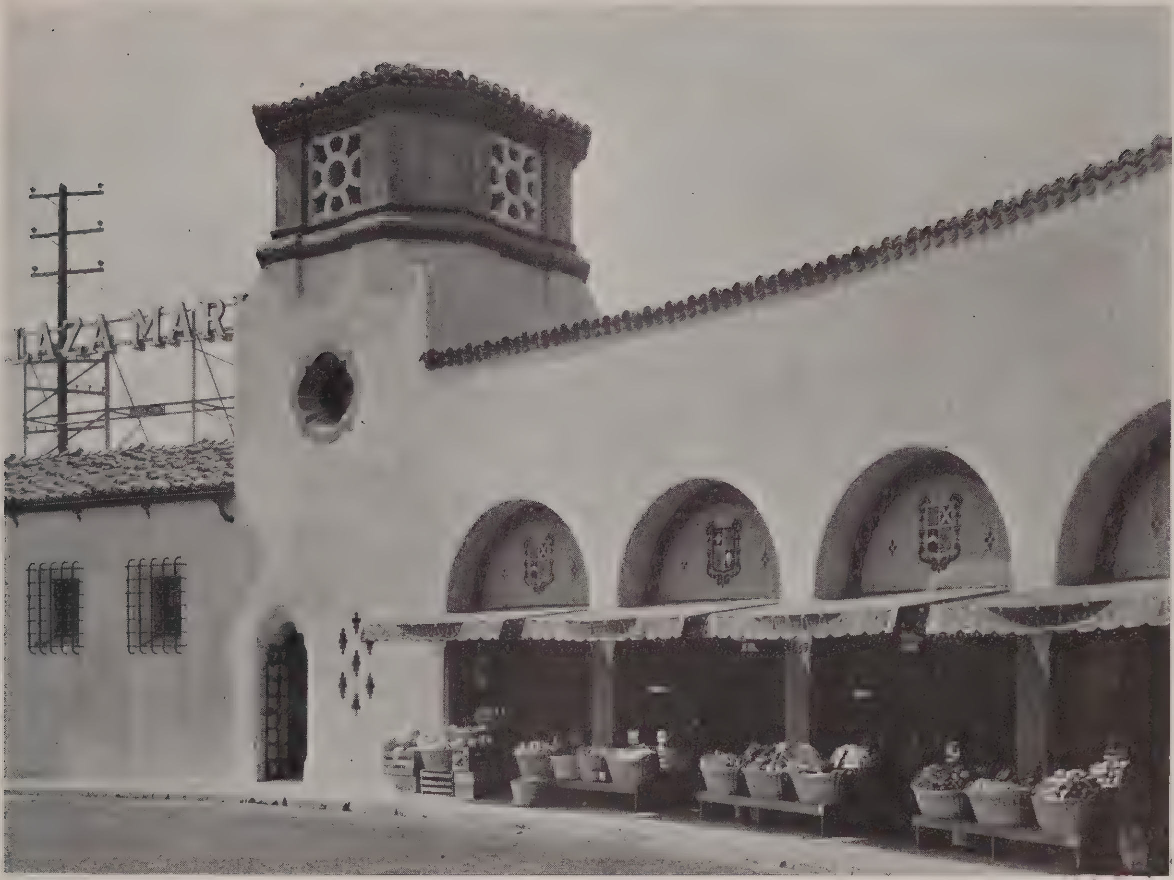


Mullen & Bluett Store, Pasadena
Morgan, Walls & Clements, Architects

of view, but in their appeal to the buying public as well, that rapid development stimulated by business competition has resulted. Furthermore, this architectural appeal must be consistent, and must extend to store interiors, which must be attractive and provide an atmosphere favorable to the display of the particular merchandise for the sale of which the store is to be used. All of these commercial projects must first of all be built upon a sound economic foundation, and the most rigid curtailment of expense which will produce the desired result is exacted by many an owner. This often results in a most ingenious use of materials and methods of construction which make it possible to erect these small buildings, some of them lavish in detail, for sums within the budgets of the individual owners, which enables them to meet competitive rental schedules.

The coming of the automobile has also exerted a profound effect upon the design of store buildings in cities. Increasing traffic congestion in the past few years is, in many localities, largely responsible for a movement toward decentralization and an increased activity in the erection of retail stores in outlying sub-centers. Even so, in many instances parking difficulties are so great that retail business is curtailed unless some provision is made for off-street parking. It is therefore not infrequent to find a building designed for the convenience of patrons who arrive by motor, had either by the inclusion of a garage in the scheme, or more often in the use of a patio which is accessible from the street, and which provides parking space for patrons. Many so-called "drive-in" markets are results of this demand, and Spanish architecture, employing open arcades, etc., is particularly fitting for this type of building.

The patio, which in itself is characteristically Spanish, is often not only an architectural feature of great interest but an economic asset as well, even though it is not used for parking space. Notable examples of buildings wherein the patio plays a most important part in increasing interest and charm, as well as in increasing the rental returns, are seen in the accompanying illustrations of the McKinley and Wilshire Central Buildings in Los Angeles. These structures are located on the same side of an important traffic artery, Wilshire Boulevard, on opposite corners of its intersection with an avenue of somewhat lesser importance. The sites for both buildings are nearly identical in size and of such propor-

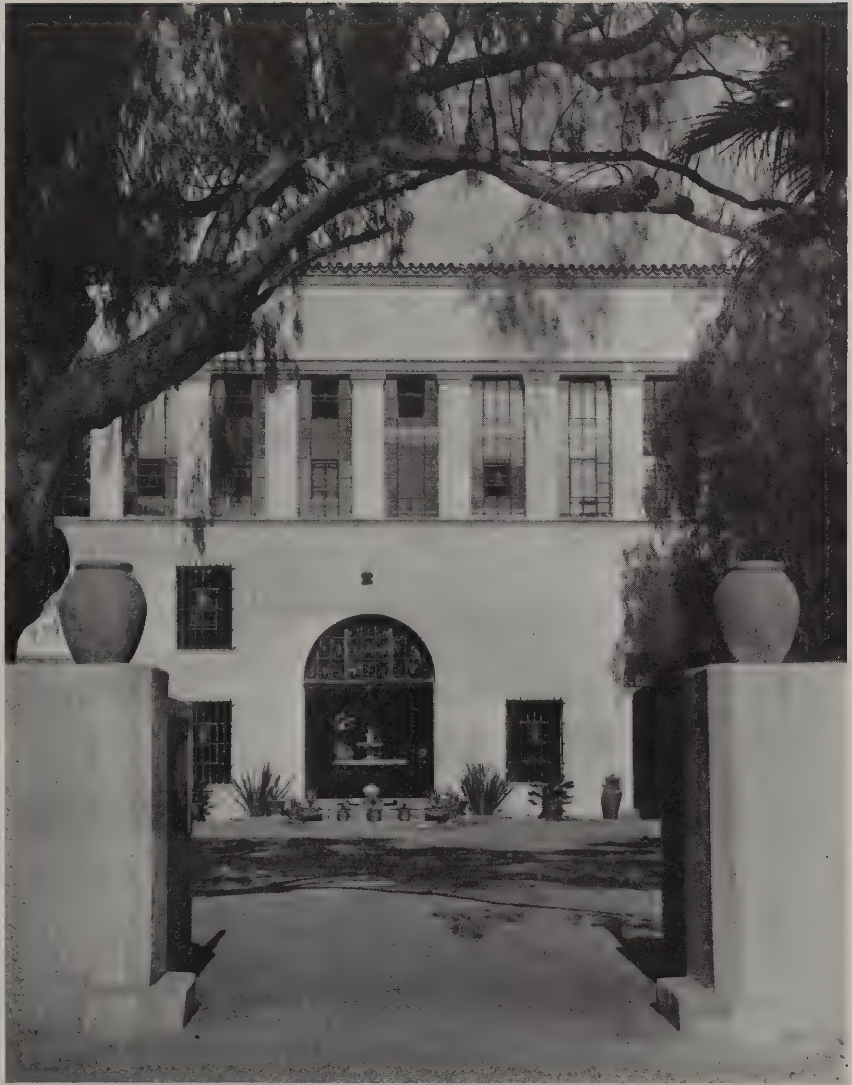


Plaza Market, Los Angeles
Morgan, Walls & Clements, Architects

tions that it would have been impractical to develop the entire depth for retail merchandising purposes. The inclusion of a patio, 33 feet by 82 feet, back from the street fronts the desired depth of stores, and having direct access to both streets by means of attractive corridors, was found to offer an exceptionally fortunate solution of the problem. It will be seen that the patio is a distinct architectural asset and that its planting and fountain make it an attractive spot not only for curious shoppers, but for the occupants of the stores themselves. Furthermore, all the stores are provided with double fronts, one on the Boulevard and one on the patio, and the usual unsightly service door is eliminated. Experience has proved that the display space at the minor or patio fronts of the buildings is very desirable. A stairway and elevator lead from the corridor to the second floor loggia, opening onto the patio, from which access is provided to studios on this floor. Each studio also has its own show window opening upon the loggia and is well lighted by means of street front windows, a species of clerestory window over the loggia, and by generous skylights hidden from view and providing an abundance of well distributed north light.

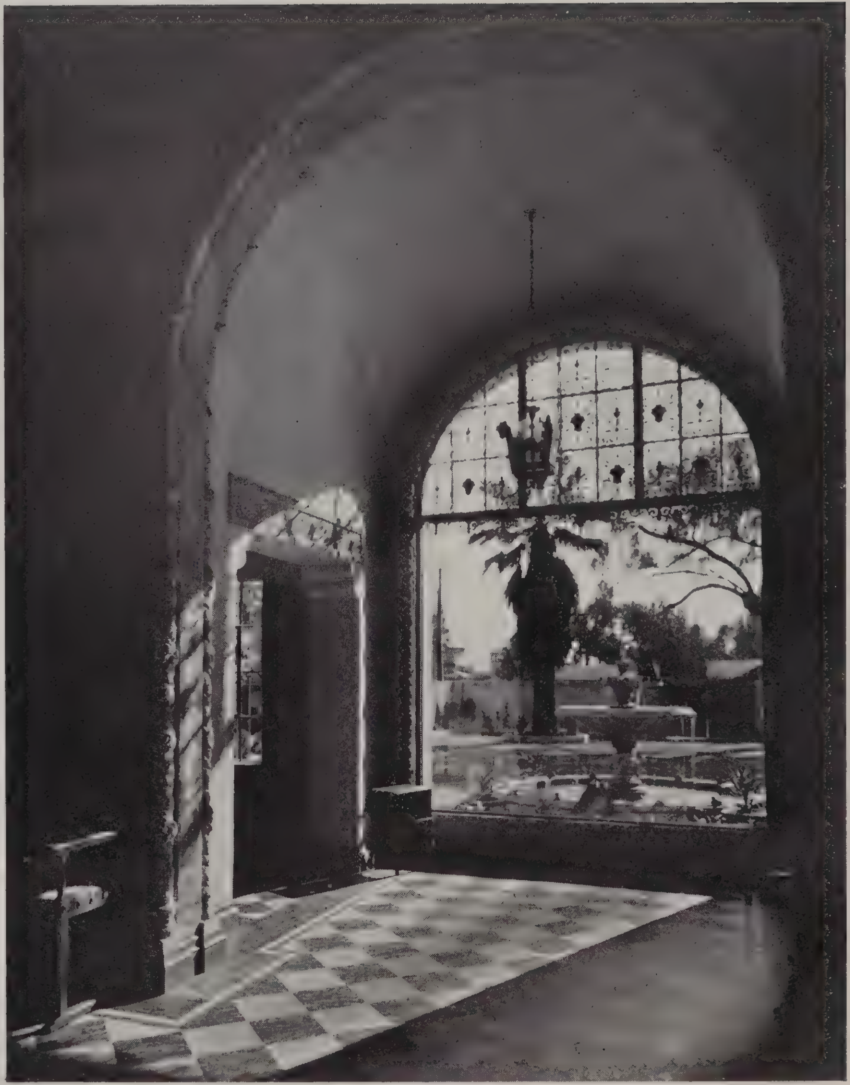
These two buildings, similar in plan and therefore in mass, will be seen to form à symmetrical group about the axis of the minor avenue. Thus each owner profits by the proximity of the building of the other. Though similar in mass and style,—Spanish,—the buildings differ widely in architectural detail, the McKinley Building falling into the character of the "Plateresque" period of the Spanish Renaissance, and the Wilshire Central Building showing the effect of the Moorish occupancy on Spanish architecture. Both buildings are rich in ornament which is executed in cast stone and wrought iron. The robust, free-flowing ornament of the McKinley Building contrasts in true Plateresque fashion with the plain wall surface which is relieved of monotony by a slight wavy texture. A frieze of decorative wrought iron forms a continuous band above the store fronts, thus unifying the composition of the lower stories and affording contrast both in color and texture with the wall surface above. The walls of this building are a very light varying tint of cool blue-gray, and the stonework is darker warm gray, both colors being accentuated by the mottled tile roof of varying shades of red.

The all-over patterns of rich Moorish orna-



Photos. Miles Berne

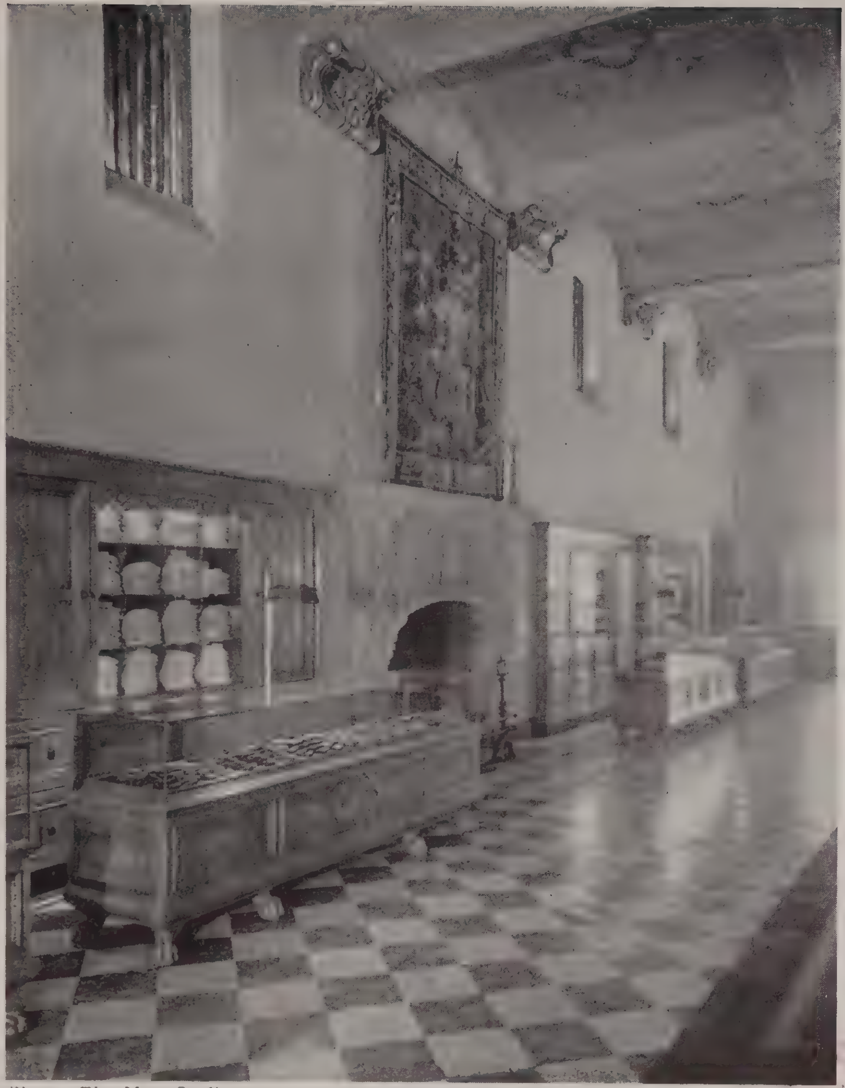
PATIO AND ONE SIDE OF BUILDING



END OF STORE, LOOKING INTO PATIO

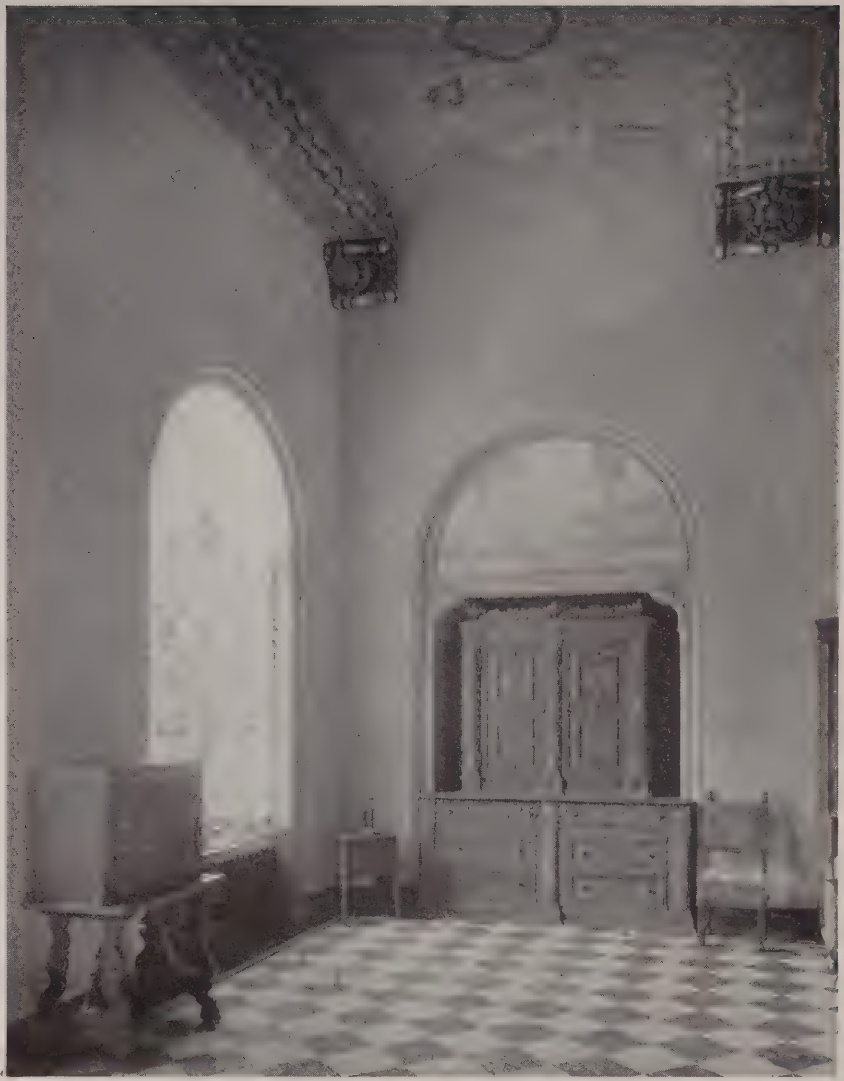
MULLEN & BLUETT STORE, PASADENA

MORGAN, WALLS & CLEMENTS, ARCHITECTS



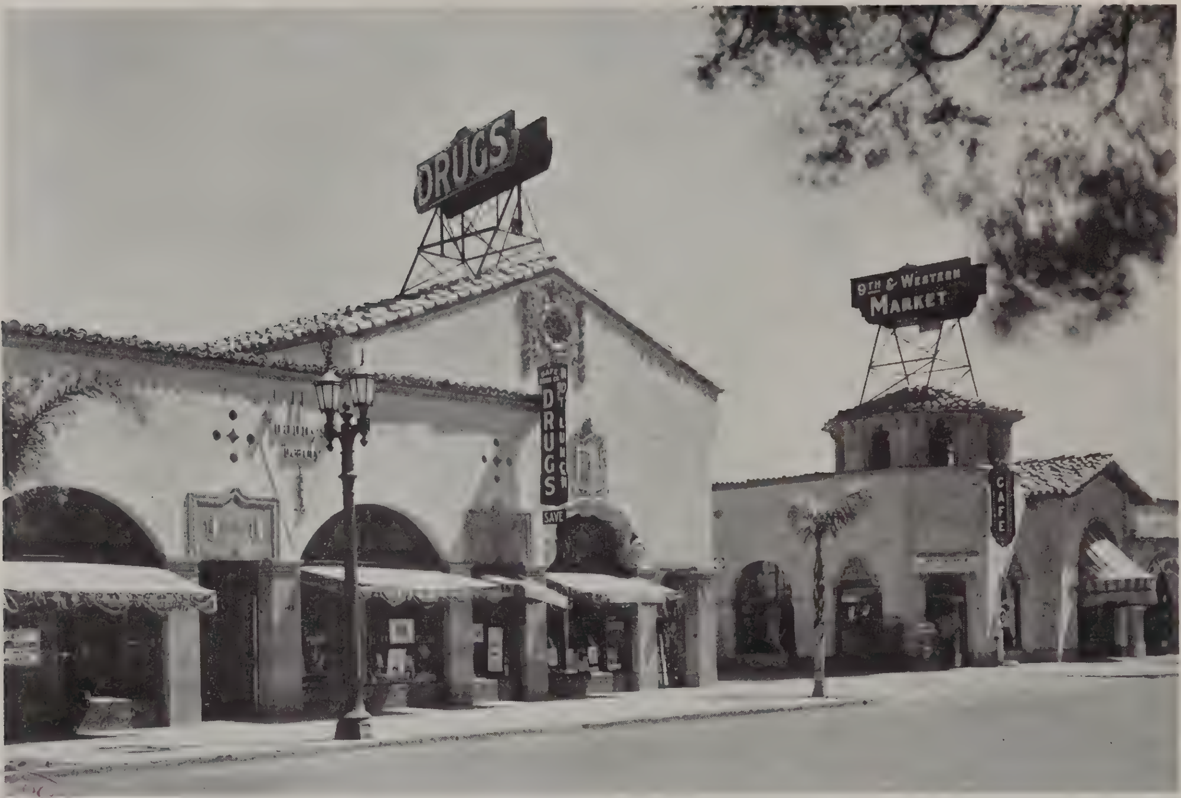
Photos. The Mott Studios

INTERIOR VIEW

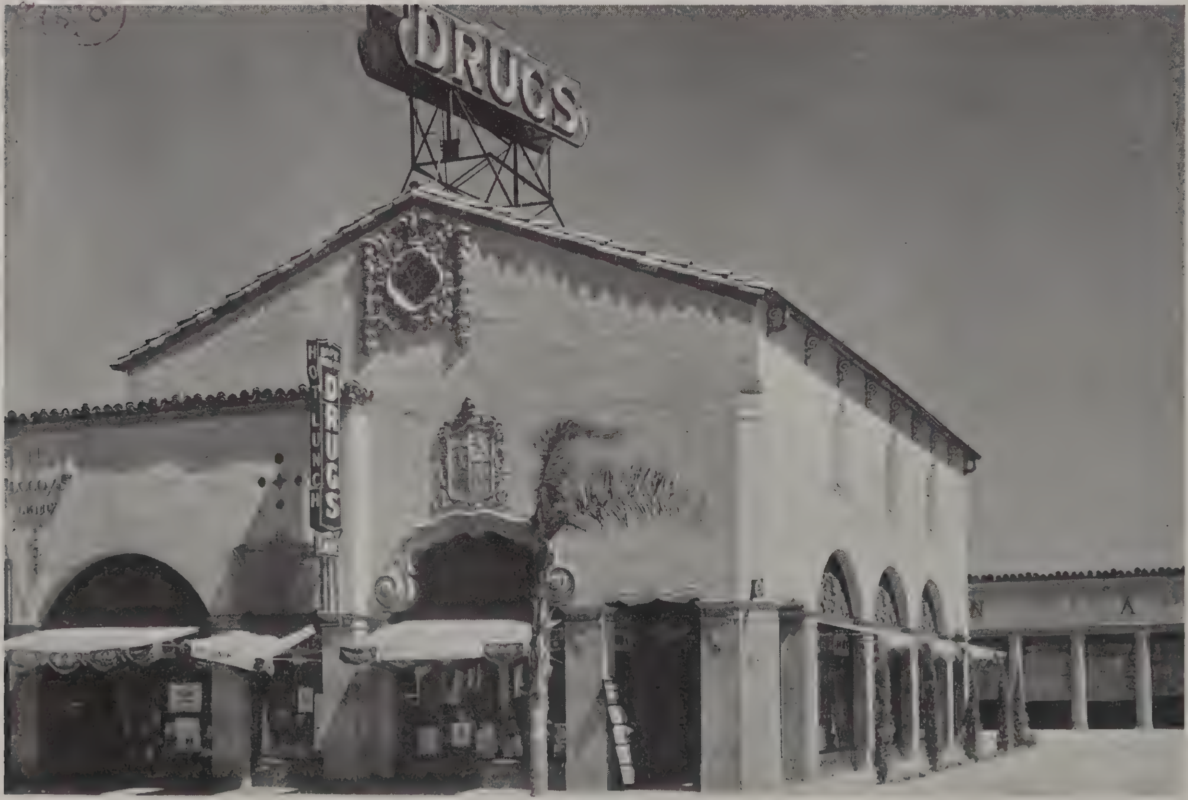


CORNER OF STORE

MULLEN & BLUETT STORE, PASADENA
MORGAN, WALLS & CLEMENTS, ARCHITECTS



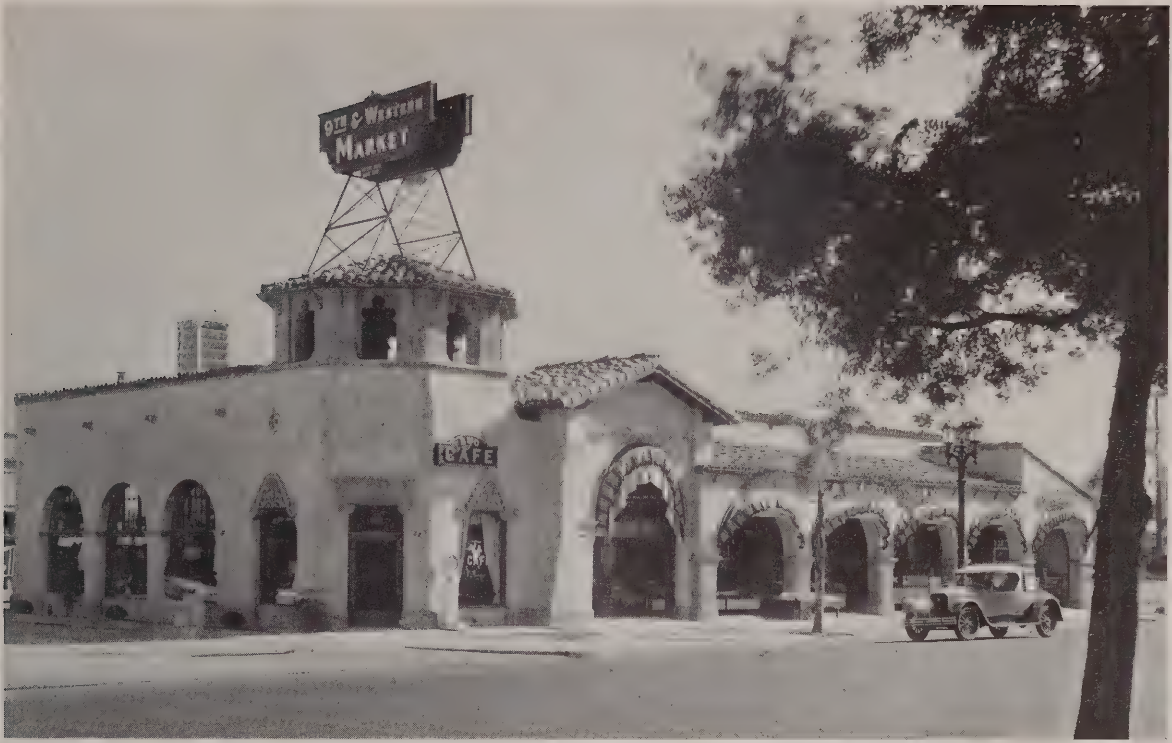
STORE GROUP



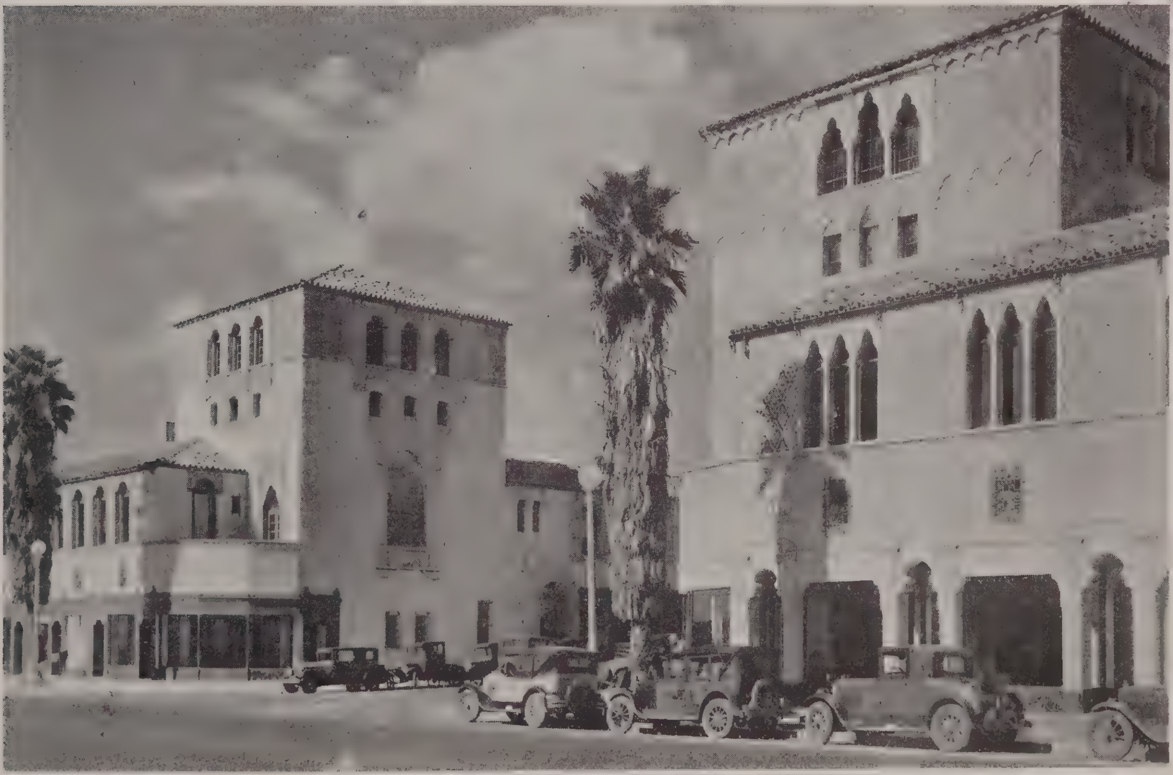
NORTH BUILDING

GROUP FOR THE BEVERLY WILSHIRE INVESTMENT COMPANY, LOS ANGELES

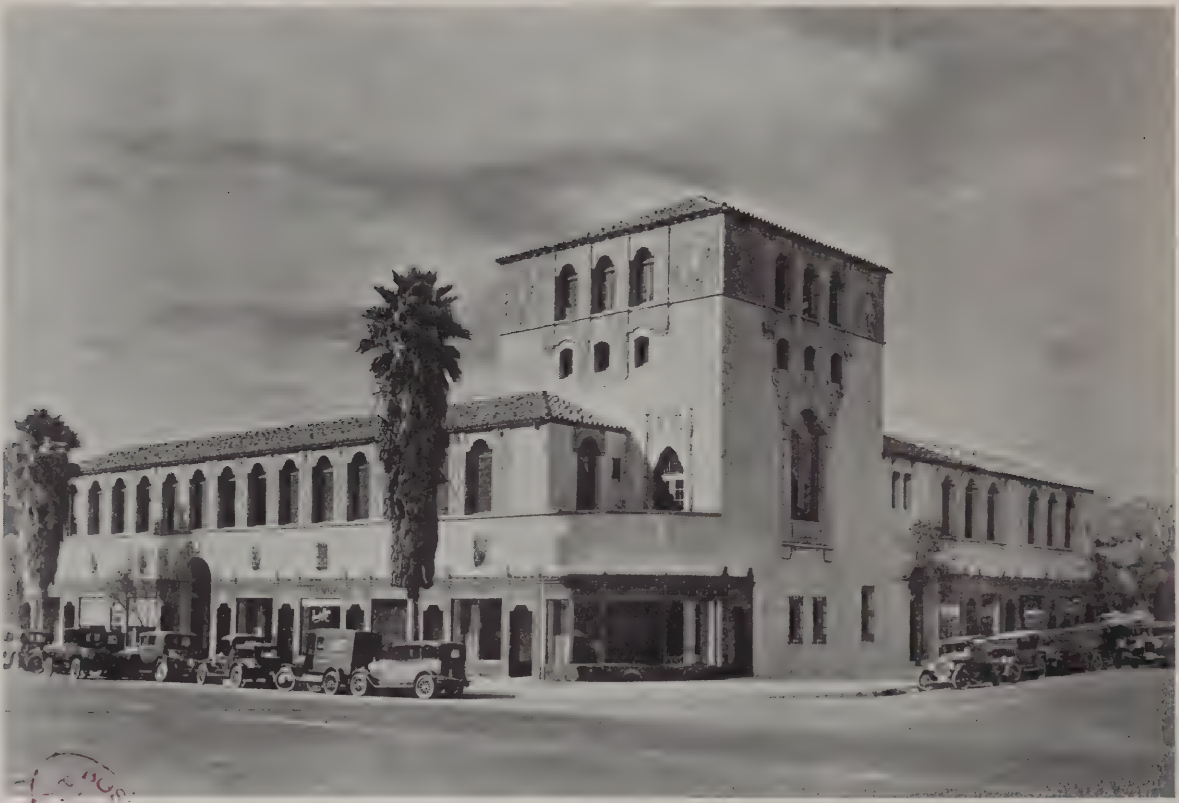
MORGAN, WALLS & CLEMENTS, ARCHITECTS



SOUTH BUILDING
GROUP FOR THE BEVERLY WILSHIRE INVESTMENT COMPANY, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



WILSHIRE CENTRAL BUILDING AND
McKINLEY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



McKINLEY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

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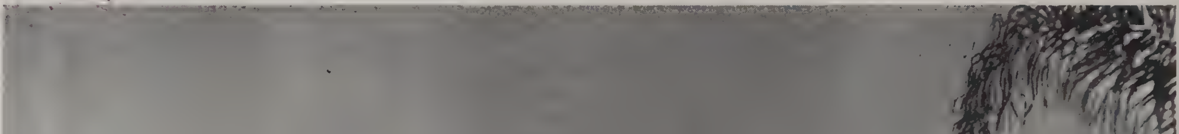
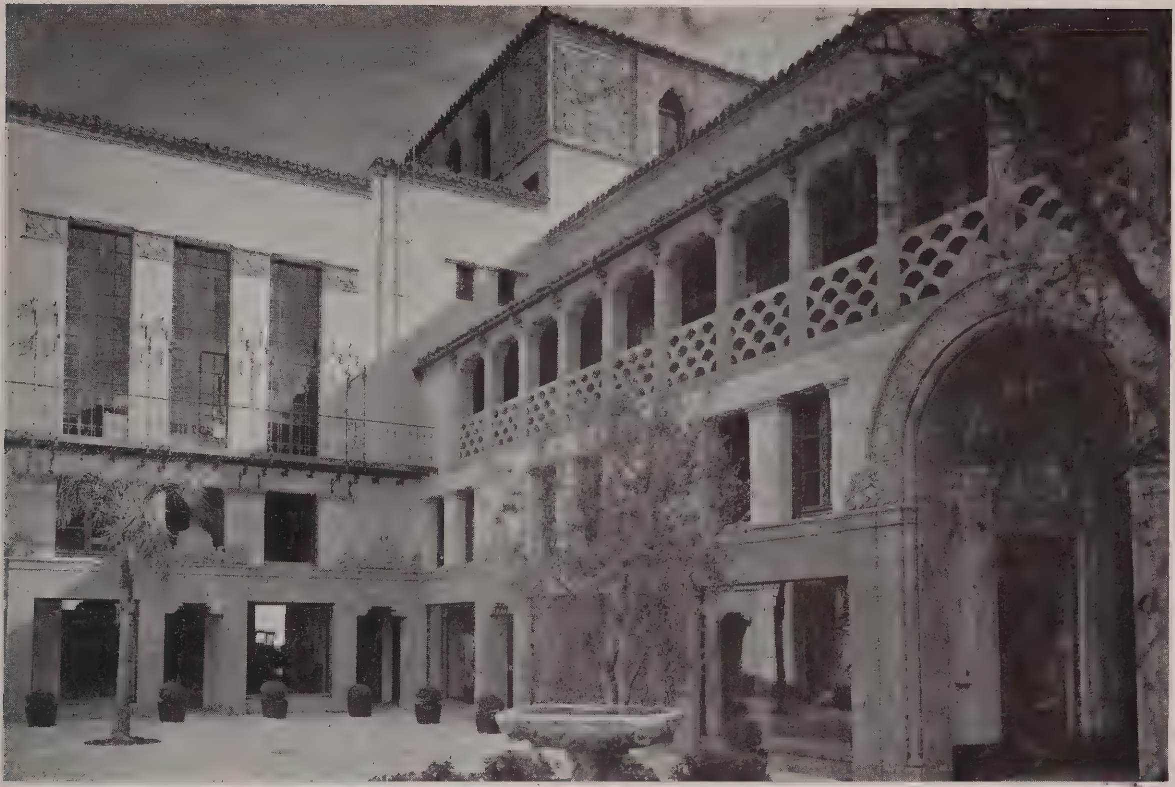


WILSHIRE CENTRAL BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



PATIO, McKINLEY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

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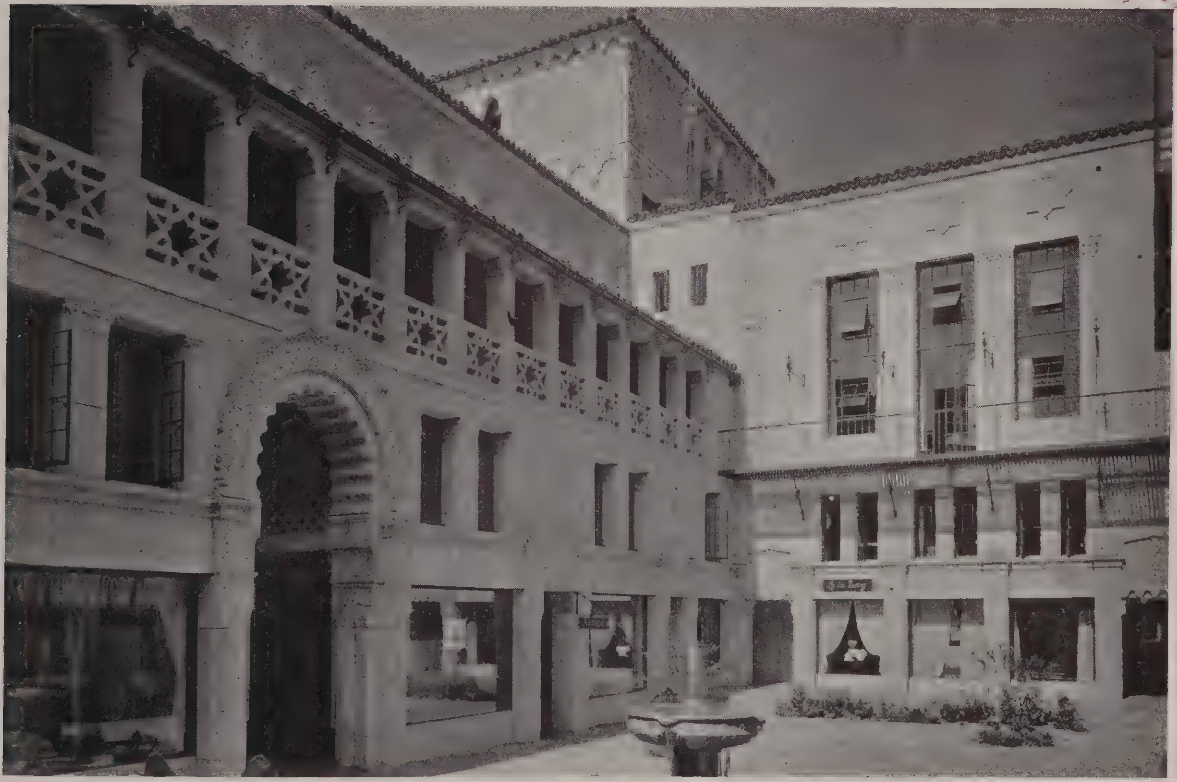

PATIO, WILSHIRE CENTRAL BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

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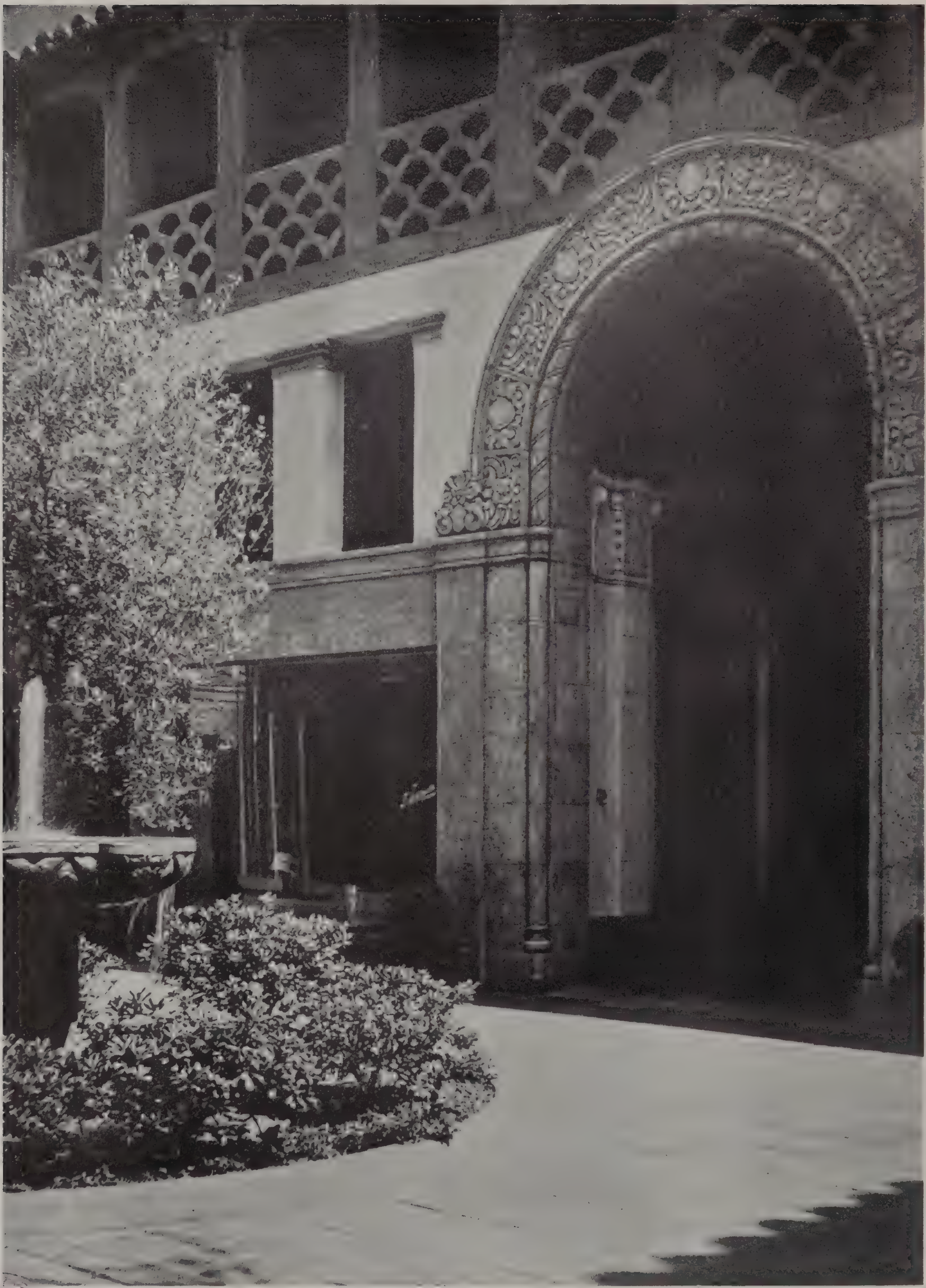
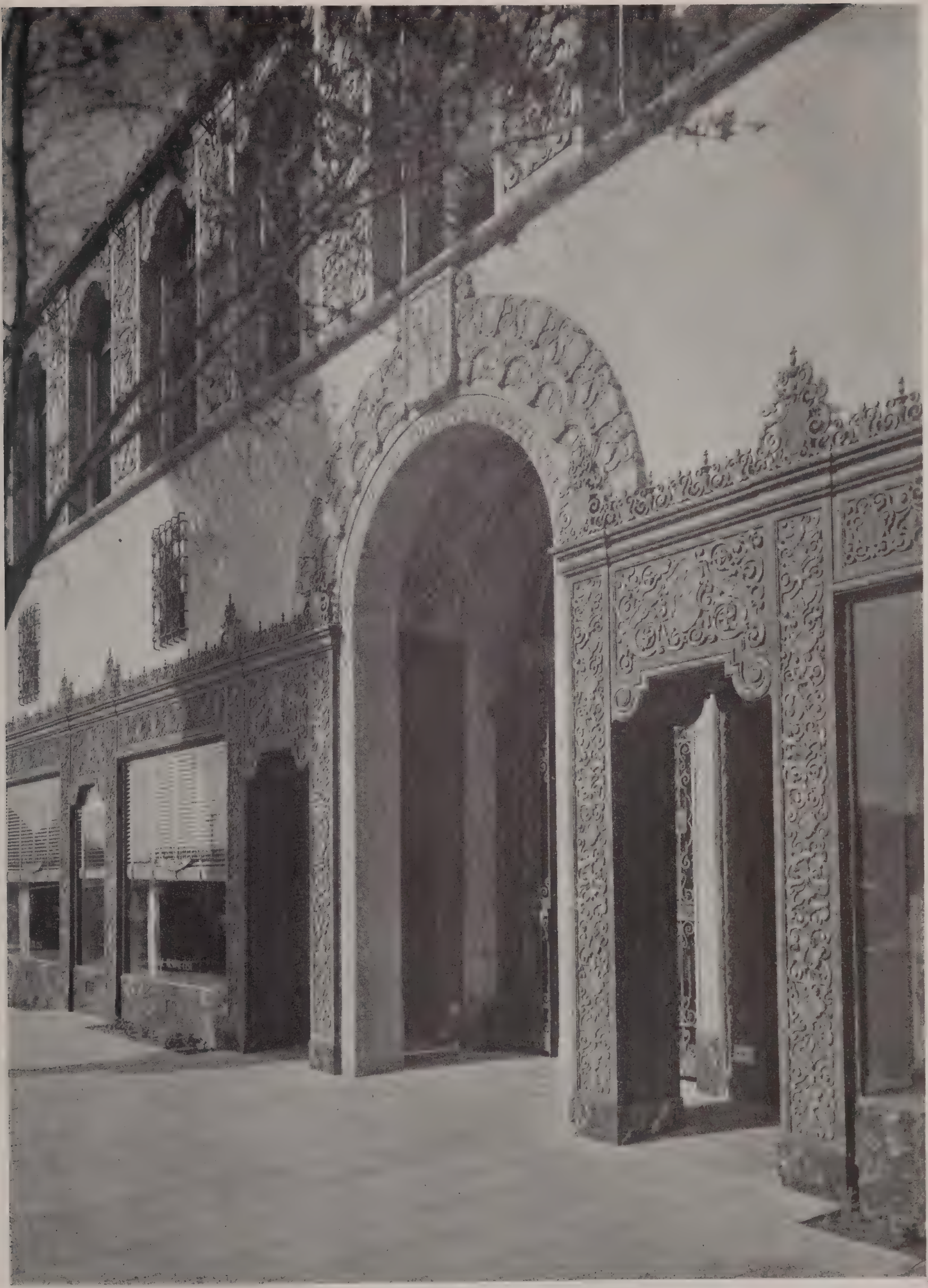
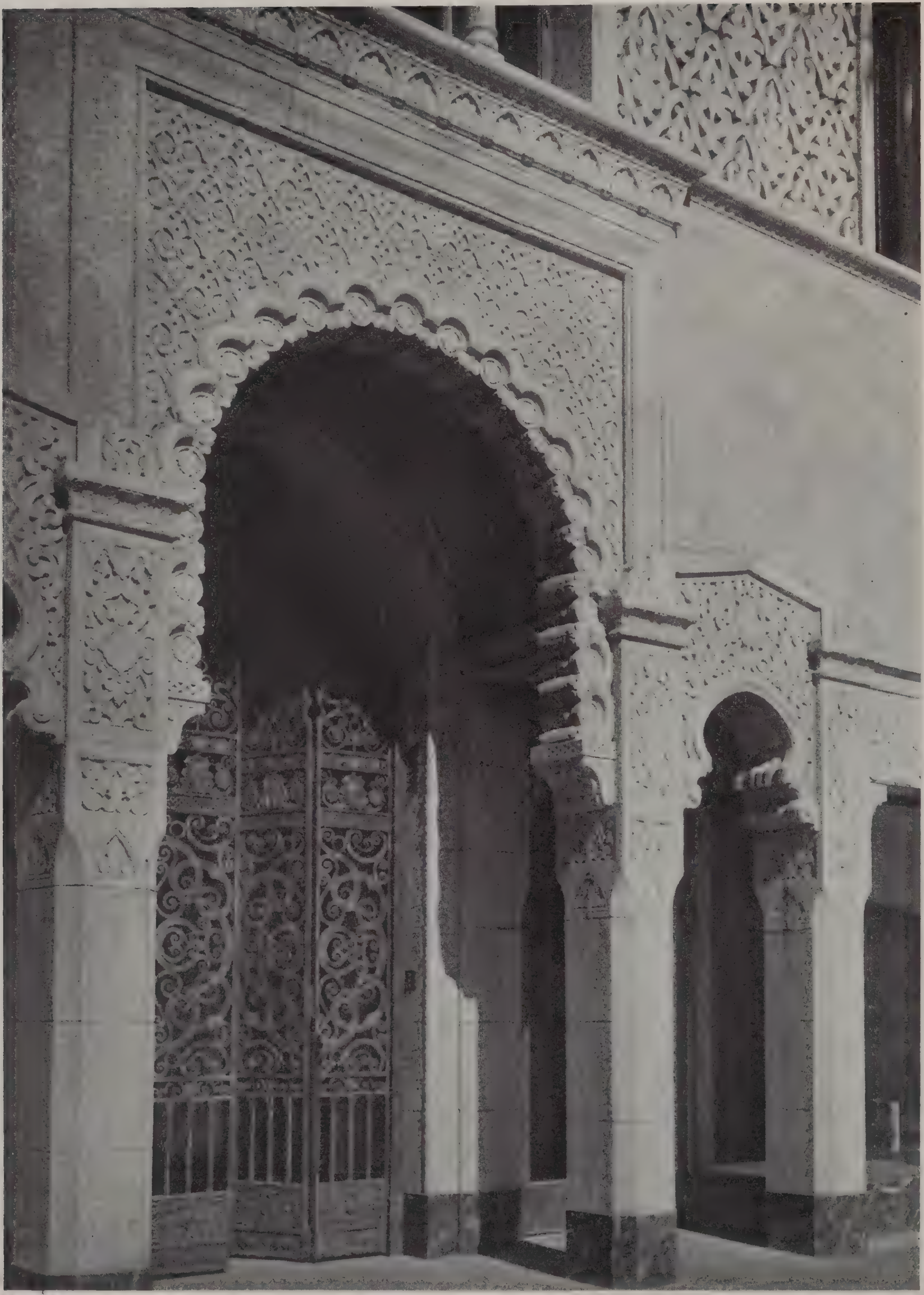


PATIO AND ENTRANCE
McKINLEY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



ENTRANCE TO PATIO
McKINLEY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



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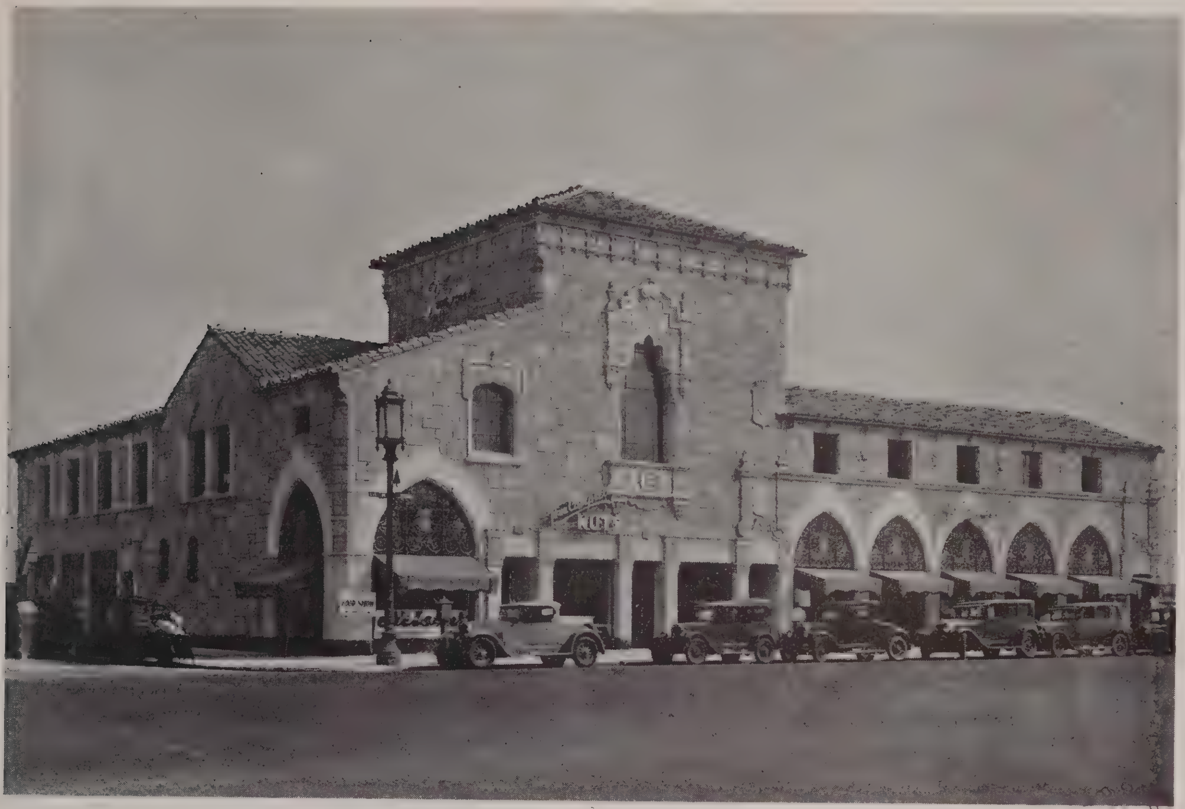
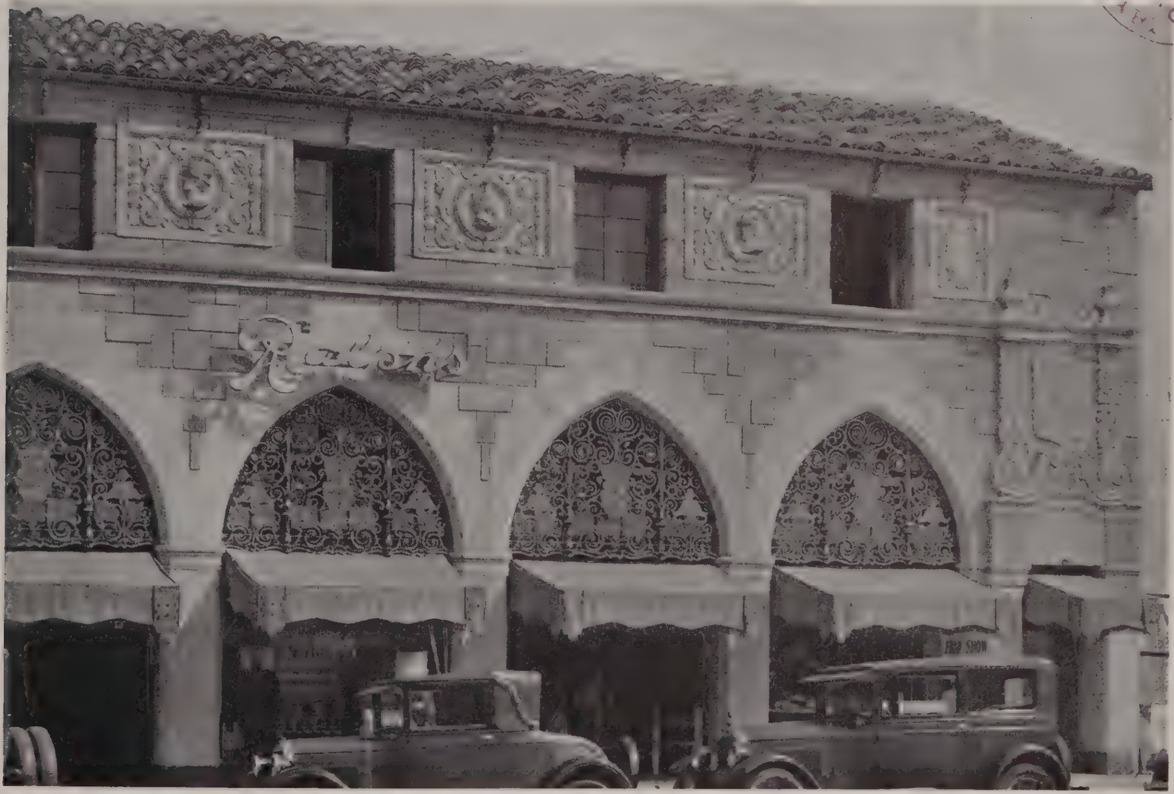
ENTRANCE TO PATIO
WILSHIRE CENTRAL BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



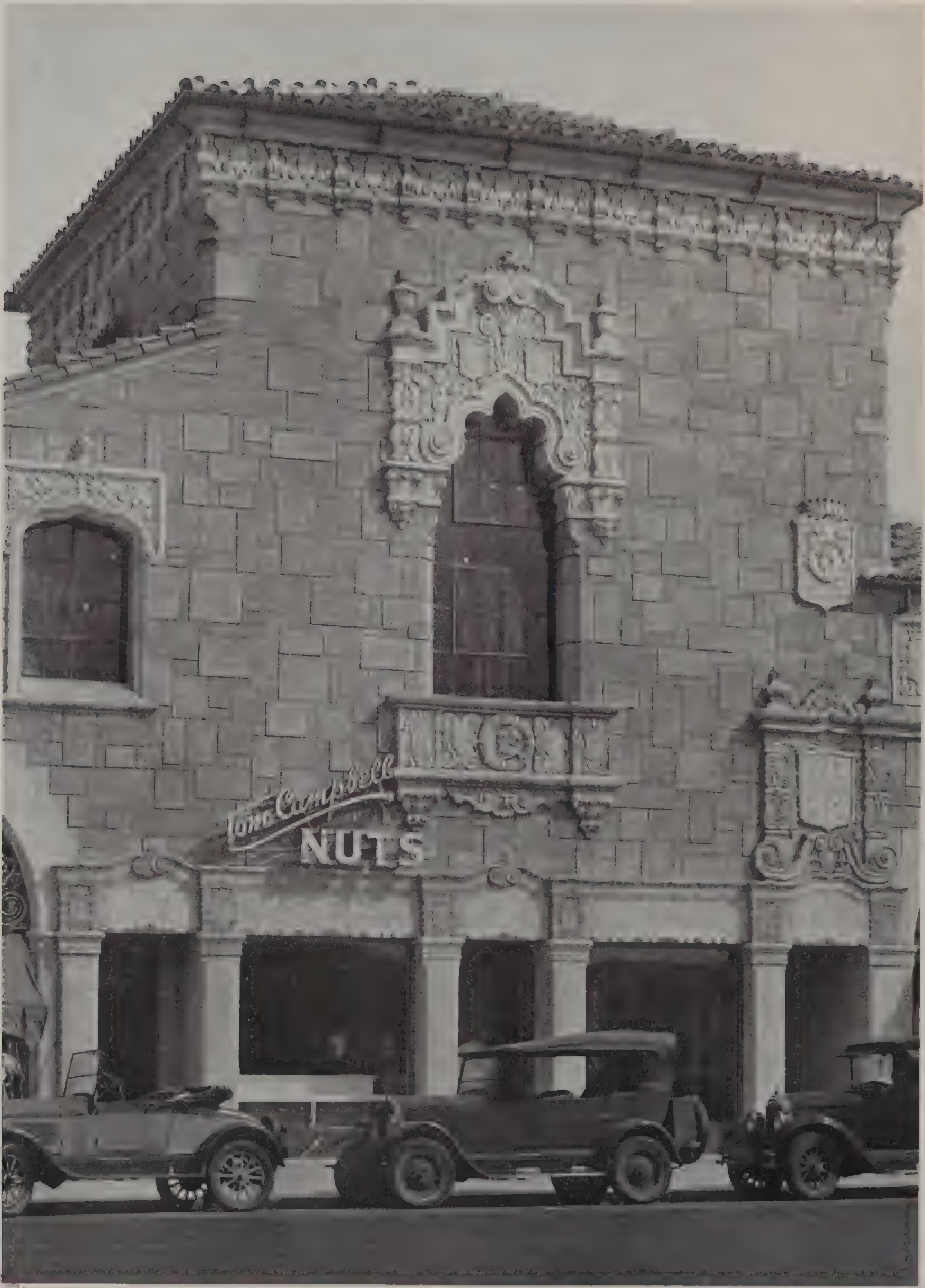
GENERAL VIEW



DETAIL OF SHOPS

RALPHS GROCERY COMPANY BUILDING, LOS ANGELES

MORGAN, WALLS & CLEMENTS, ARCHITECTS



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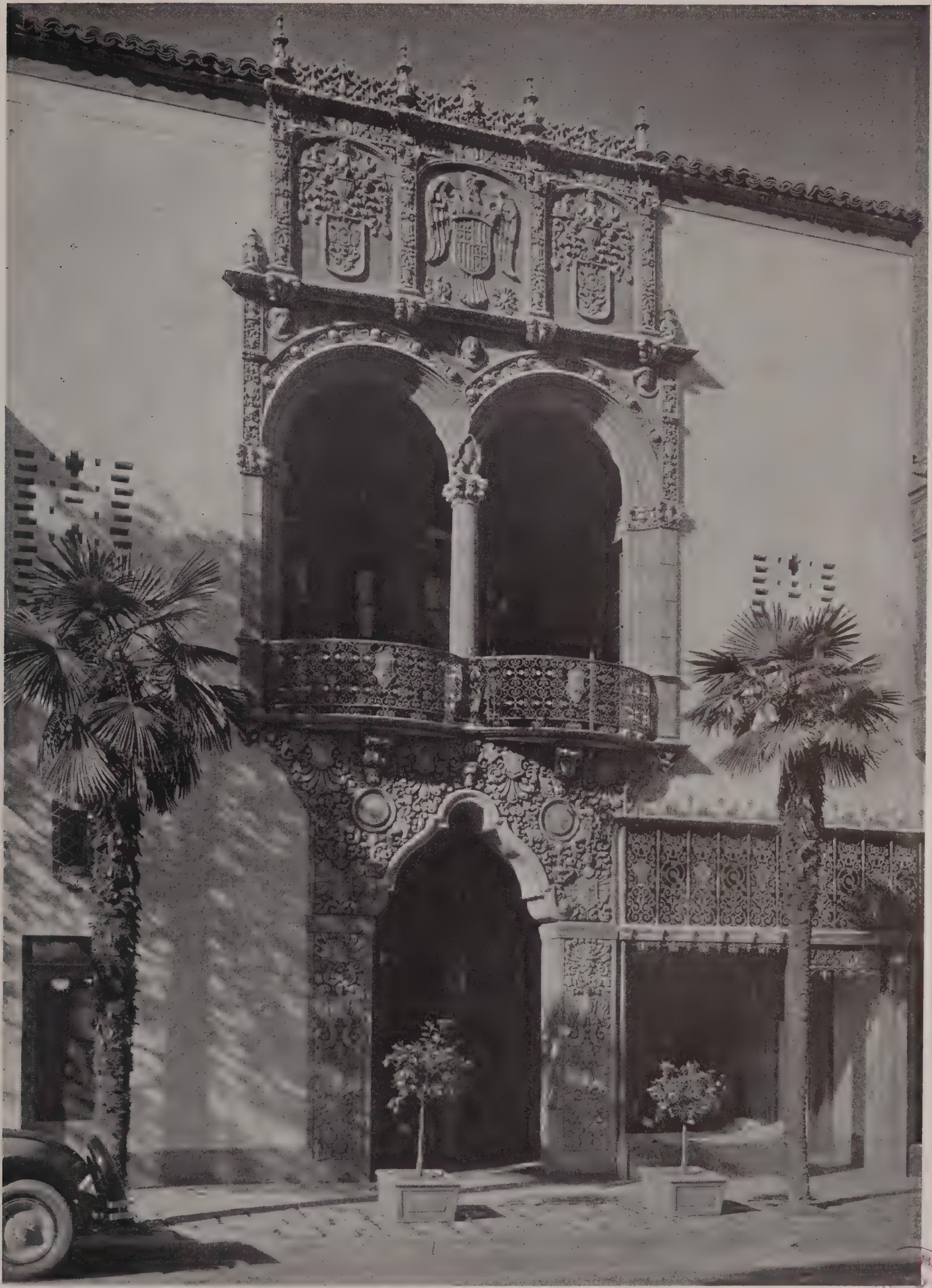
DETAIL, MAIN PAVILION
RALPHS GROCERY COMPANY BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS



MAIN ENTRANCE
HAYWARD BUILDING, LOS ANGELES
MORGAN, WALLS & CLEMENTS, ARCHITECTS

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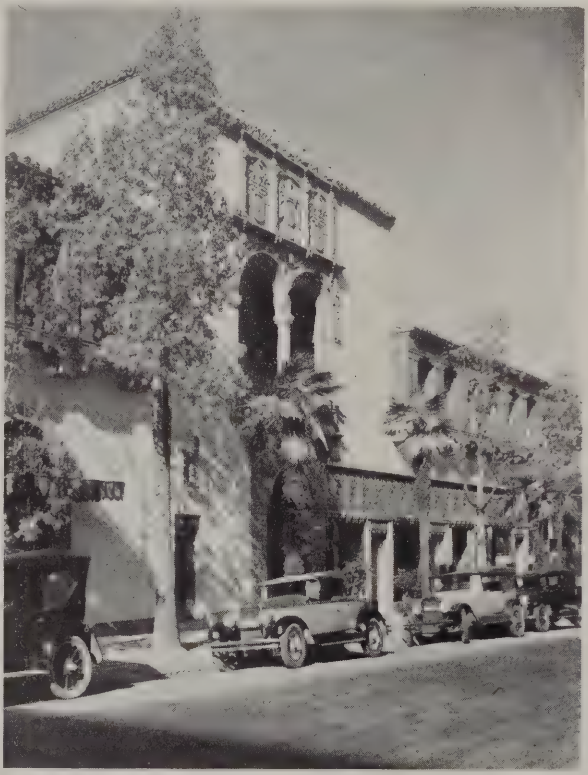
ment on the Wilshire Central Building are of light buff cast stone suggested by the pierced grilles of the Alhambra. The frieze around the tower has a slight color accent produced by a judicious use of dull colors in connection with the all-over pattern. The plaster of this building is combed horizontally with a tool having pointed triangular teeth about one half inch on centers and one half inch deep. This has produced a most satisfactory and interesting wall texture which harmonizes very well with the comparatively small scale ornament of the building. Wrought iron and a tile roof, similar to that on the McKinley Building, also add interest and keep the structures in character and agreement with each other.

Another very interesting Spanish store structure is seen in the illustrations of the Hayward Building. Here a combination of masonry and wood construction is used, the wood portions contrasting with the stone and plaster of the higher central loggia. This loggia and the principal entrance below form the focal point of interest on the facade and exemplify the Spanish principle of the concentration of ornament contrasting with adjacent plain wall surfaces. The ironwork, intricate and refined, exceedingly well designed and executed, is also worthy of the attention of the observer.


Hayward Building, Los Angeles
Morgan, Walls & Clements, Architects

The Pasadena store of Mullen & Bluett is of particular interest and importance because it was one of the first to provide for the needs of the motorist. Here the left hand entrance is in reality a driveway which leads through the building to a patio or motor court at the back. Within the patio there is an entrance to the main sales room, there the motorist may turn his car over to an attendant who will park it, and the patron may then go into the store and make his purchases. A view from the store shows how this patio has been treated with enclosing walls, planting and a fountain. This arrangement not only lights part of the store, but renders it so attractive that space upon this side is more than usually valuable for sales purposes. The view of the facade of this building shows how the florid character of the late Spanish Renaissance has been maintained and the sizes of the windows increased to areas even in excess of those found in many commercial buildings in other styles. This facade with its soft colored stone tile frieze at the top is floodlighted from projecting points and reveals its interest and beauty at night as well as in the daytime. A close examination will show that the display windows are separated from the interior of the store by decorative wrought iron grilles in the arched openings at the back, and that the attractive interior is thus visible from the street. Especially designed cases and fixtures take their places in this interior unobstrusively, and the fireplace adds materially to the charm and distinction of the room. The patio's facade, though simple in design, has a definite Spanish character which is entirely appropriate to its surroundings and harmonizes with the rest of the building inside and out.

Another evidence of the necessity for providing parking space for the motorist is seen in the demand for the so-called "drive-in market." These buildings, as the name implies, are so arranged that patrons may drive their cars off the street into parking spaces provided for them, and in many cases, may make their purchases directly from their automobiles without getting out. The Plaza Market is an unusual example of such a structure. Here, owing to the fact that the shape of the lot was a parallelogram instead of a rectangle, it was possible to construct the front wall of the building with its arcade on the arc of a large circle. This type of building can be very effectively designed in the Spanish style. The Renaissance forms of ornament of the Ralphs Grocery Company Building, together with the pointed arches and delicate ironwork, show the development of a design in the character of more refined Spanish Renaissance work. An interesting contrast with this building is the group of stores for the Beverly Wilshire Investment Company, which are rugged and simple in character.

7.a.

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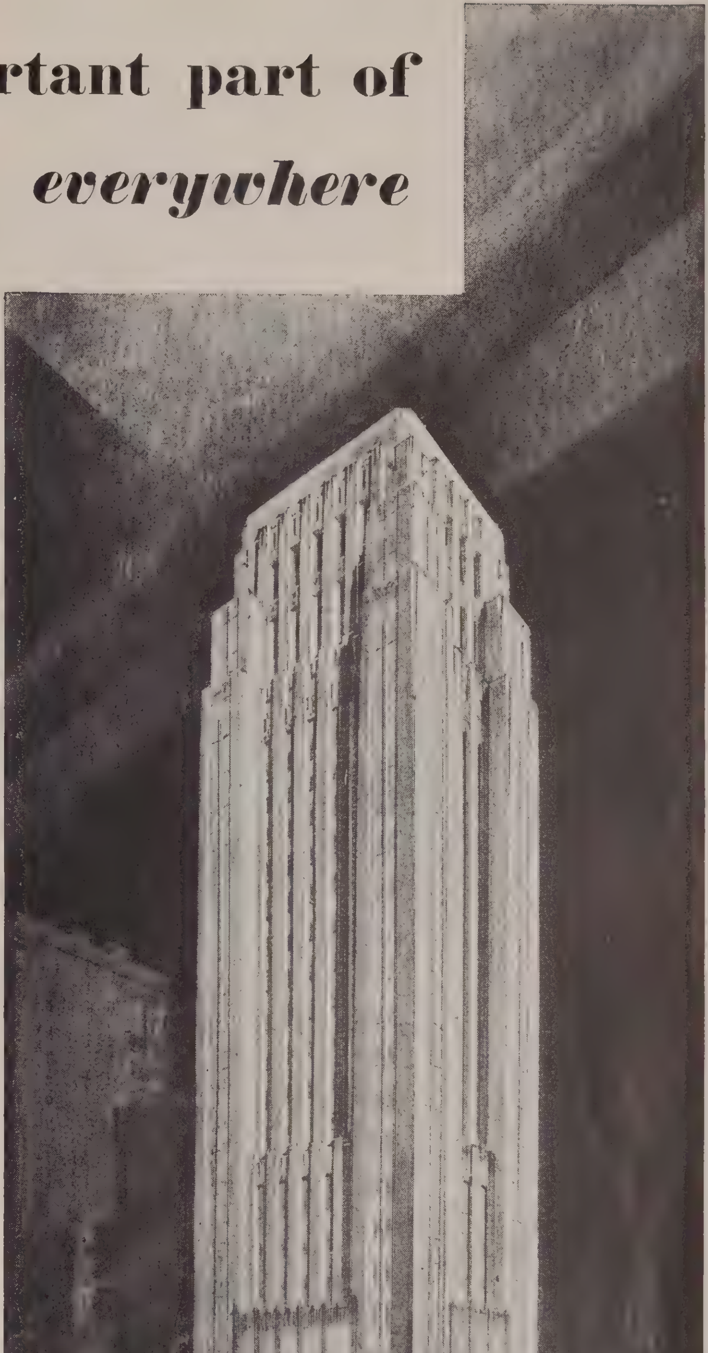

The new RANDMEMORIAL TOWER, in Minneapolis, Minn., protected by a Barrett Specification Roof. *Architect:* Holabird & Root, Chicago, Ill. *General Contractor and Roofer:* C. F. Haglin & Sons Company, Minneapolis, Minn.

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AGAIN VAN EQUIPMENT OF MONEL METAL IS SELECTED FOR A SAVARIN RESTAURANT

The Great
VAN FACTORY
The largest of its kind in the world

Left, a general view of the superb kitchen of the new Savarin Restaurant in the New York Life Building, New York. Cass Gilbert, *Architect.*

It is interesting to note that approximately twelve tons of Monel Metal were used in the new Savarin. The John Van Range Company—the largest single user of Monel in kitchen equipment field, has long been famous for its Monel Metal Equipment.

Above, a view of the counter section of the Savarin. This equipment was designed and built in the great Van Factory.

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See SWEET'S, pages C4040 to C4045 for important architectural information.

ATLANTA
CLEVELAND

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EQUIPMENT FOR THE PREPARATION AND SERVING OF FOOD
Cincinnati

DALLAS
NEW ORLEANS

DIVISION OF ALBERT PICK-BARTH COMPANY, INC.

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New York Sales Office
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Cincinnati Sales Office
Oakley

MEDICAL ARTS BUILDING
Cleveland, Ohio

ARCO ARCO ARCO ARCO ARCO
ARCO

Architects: GRAHAM, ANDERSON, PROBST and WHITE, Chicago
Plumbing and Heating Contractor: A. R. BRUEGGEMAN CO., Cleveland, Ohio

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BOOK DEPARTMENT

STAGE LIGHTING

REVIEWED BY

ROBERT L. AMES

THE interest of the present-day theater is due to a variety of causes, among the chief of which is the use of accessories which in the hands of certain modern wizards of stagecraft might almost seem to have been given their utmost imaginable exploitation. The modern drama originated within the walls of cathedral or church, with ecclesiastics as actors and the gray stone of nave or choir as a setting, the action dealing with some sacred or scriptural theme or else developed in the form of a "mystery" or a "miracle" play. With the setting up of the stage outside the church, though still often using the church as a background, the playing was done by laymen; only when the drama moved from the church into the market place or into the courtyard of an inn did it wholly part with its ecclesiastical tradition,—and such was its status when Shakespeare found it in the sixteenth century. The beginning of the use of scenery marked a vast change in the life of the drama, for with scenery there might be made some attempt at creating a setting which would heighten the illusion and make more true to life the drama being worked out upon the stage. But the development of lighting was still in its childhood,—in fact its infancy. The stage, however, made the best use of what means of lighting existed; candles gave way to oil lamps, the lamps yielded to gas, and we are now living in the period when gas has made its final, unconditional surrender to electricity, and electricity in the hands of theater men of the twentieth century is being made to work marvels in the way of stage lighting.

This excellent work presents an exhaustive study into every phase of lighting as applied to the modern stage. It has been prepared by one well trained in the technique of stage lighting and fully experienced in the use of the technique. The volume possesses a high value to architects, for architects are finding that each year the matter of equipment becomes more complex and more important, and that almost as necessary as skill and taste in designing and care and accuracy in construction is the matter of planning equipment,—all the countless and intricate details which are included in that most comprehensive term. When one remembers that the utility of even the costliest theater depends wholly upon the skill with which its stage is lighted, the importance of the subject may be realized by architects and their assistants.

STAGE LIGHTING. By Theodore Fuchs. 500 pp. 6 x 9 ins. Price, $10. Little, Brown & Company, Beacon Street, Boston.

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SCHOOL BUILDING PROGRAMS IN AMERICAN CITIES. By N. L. Engelhardt, Professor of Education, Teachers' College, Columbia University, 566 pp., with many maps and diagrams. 6 x 9 ins. Price $5. Bureau of Publications, Teachers' College, Columbia University, 525 West 120th Street, New York.

THERE are few buildings involving greater annual expenditures than schools. It is estimated that the average cost of school buildings in the United States per year is about $400,000,000. The spending of this enormous amount of money presents a problem that in fairness to the taxpayers, as well as to the pupils who are to attend the schools, should be solved in a way to insure the utmost possible return in terms of utility and service, as well as in æsthetic worth. In approaching this problem, those who are charged with the responsibility may well profit by the example of modern business. It is a well known fact that much of the tremendous progress being made in industrial and business fields is due to the fact that every move is carefully planned in advance and is justified by a careful scientific investigation of existing conditions and those likely to arise in the future. Thus money and labor may be expended in the most efficient manner possible. For example, telephone companies lay cables and construct exchanges not only to meet present or isolated conditions, but in terms of estimates of future patronage. Any enterprise that is planned for the purpose of serving the public should be founded on a similar scientific and exhaustive survey.

One of the characteristics of present day building is the quickness with which buildings become obsolete and have to be replaced. In some instances this may be due to unavoidable causes, such as rapid growth, or to conditions and developments that could not have been foreseen. In many cases, however, such wasteful operations are made necessary by a lack of foresight or sufficient study on the part of the planners. This is particularly true in the case of school buildings, as is shown by numerous reports on school building programs. Such careless planning produces, among other things, various conditions in school systems. 1. Sites have been chosen without regard to their desirability from a standpoint of immediate environment, growth and population needs. 2. Small buildings have been constructed with greatly overlapping tributary areas. 3. Buildings have been erected which do not adequately safeguard the health and safety of pupils. 4. Traditional educational practice rather than the more recent trends of educational thinking and practice has dictated the space relationships and the sizes of buildings. 5. New school buildings have been erected without the possibility of making future additions, thus adding unnecessary cost to the school building program. 6. Because of the character, construction, inadequacy of planning, or faulty location, much money has been expended for buildings which could be used for but a few years and which proved to be poor investments. Such unsatisfactory results could very largely be avoided by the preparation of a carefully thought out building program, based on scientific investigation which would permit school boards to plan in terms of the larger policies of school administration, and to ignore private or political interference with the expenditure of school funds which are entrusted to them.

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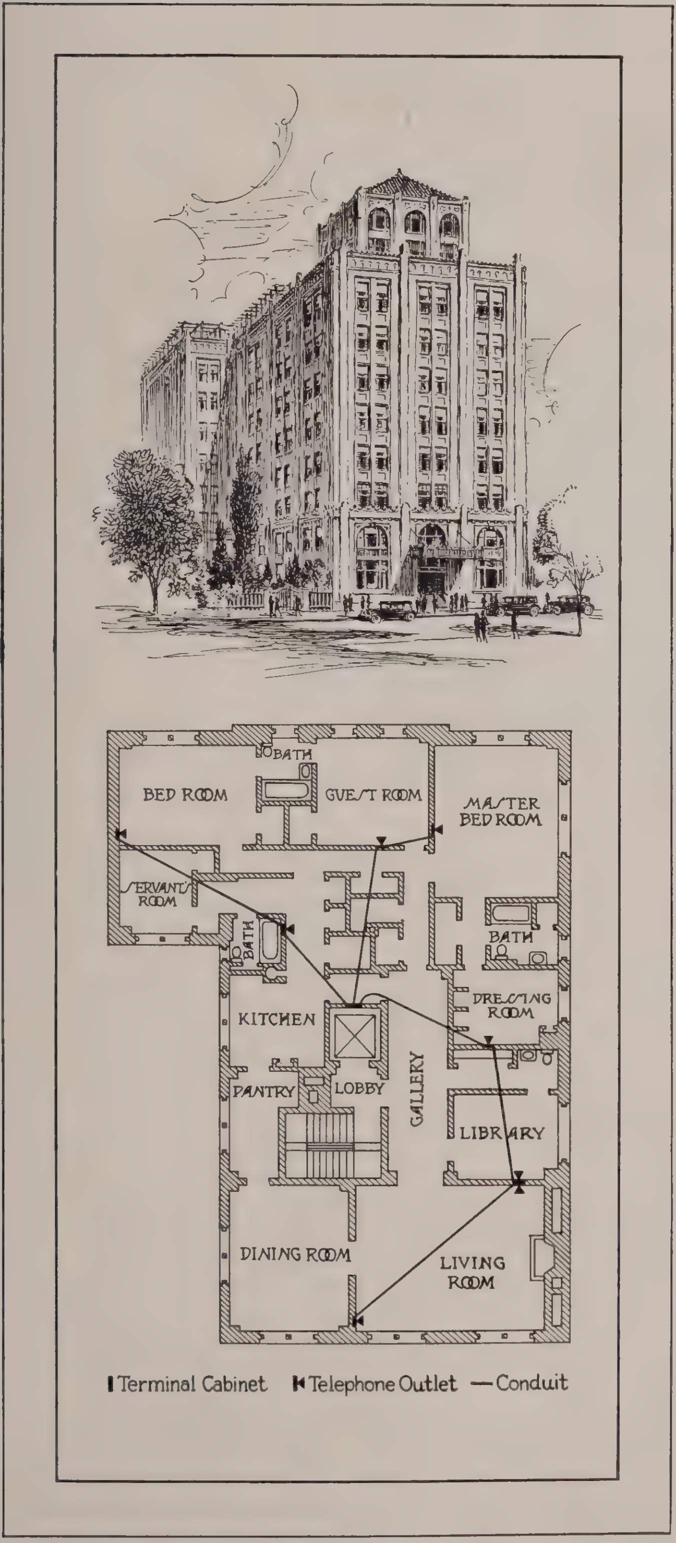

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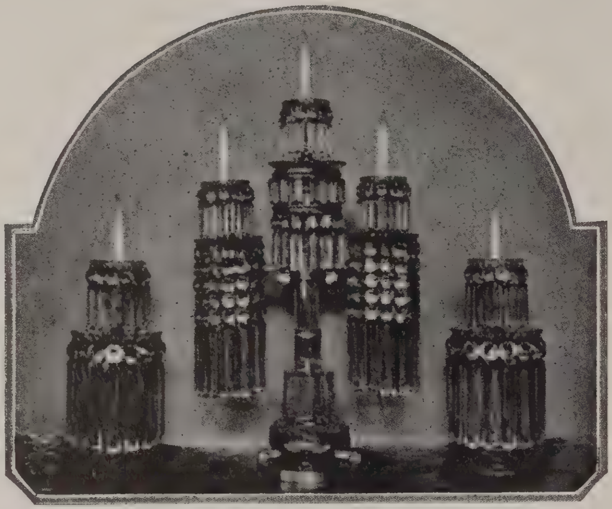
have an influence on the construction and maintenance of schools in the community. In the first place, the existing school plant must be carefully investigated and analyzed. Conditions unfavorable to the pupils of the community as a whole must be noted, and the various schools may be rated on a percentage basis. In this way it may be decided what schools may be retained, which buildings altered and improved, and which, if any, must be condemned as unfit for use. By such an analysis much is learned regarding conditions that must be guarded against in planning new buildings. Another important branch of the study deals with the growth and distribution of the population, since it is in this way that it may be estimated what are the needs which must be met during the years the building must be used.

Since the school architect often acts as adviser to the school board in all matters connected with school buildings as well as actually planning the structures, it is quite essential that he should become familiar with the making of school building programs, and with the various factors on which they are based. Such knowledge can be gained by a study of the school building programs of such cities and towns as already have them. Unfortunately, these reports are not always readily available, and it is to overcome this difficulty that N. L. Engelhardt, Professor of Education, Teachers' College, Columbia University, has edited and published in a bound volume the school building programs of ten representative cities in the United States. These reports have been carefully selected in order to give, as nearly as possible, a complete cross section through the educational conditions for the whole country. The cities selected were: Lynn, Mass., an established New England industrial town; Watertown, N. Y., a wealthy trading and industrial center in the St. Lawrence valley; Fort Lee, N. J., lying on the Palisades just opposite New York; Paducah, Ky., a rapidly growing industrial community of the middle west; Greensboro, N. C., a thriving city of the Piedmont region; Augusta, Ga., a noted tourist, industrial and agricultural center; Jacksonville, Fla., one of the most important commercial points in the south; Beaumont, Tex., representative of the great southwest; West Aurora, Ill., industrial suburb of Chicago; and Rye, N. Y., a wealthy suburban community near New York. In the case of southern cities, school systems for both colored and white pupils are given consideration.

These ten reports represent school building conditions and needs in the various cities at the time the surveys were made. In each instance the survey has brought about significant changes in the local situation. With these programs as a model, it will be possible for school officials and advisers to make surveys of their own schools and prepare building programs for their communities which will lead to lasting benefit and improvement. The subject matter is well illustrated by maps showing methods of studying population distribution and the selection of advantageous sites for future buildings. There are also many illustrations of school buildings in the various cities, most of which serve to point out conditions which should be remedied. These, together with many tables and the text discussion, form the basis for an intelligent approach to the school building problem and will serve as a valuable reference book for any architect who in either a professional or a private capacity is concerned with planning and erection of school buildings.



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USE of paints, stains, varnishes and similar materials, perplexing even to most architects and writers of specifications, is generally completely baffling to home owners who attempt to use such materials themselves. To the experienced painter nothing probably appears so simple as to use these products to produce the desired result and to give the necessary wear, but many a home owner finds himself possessed of painted floors which refuse to dry, of varnish which no amount of heat will prevent from being sticky, or outside paint which is washed off after only a few rains.

This is the fourth edition of Mr. Sabin's work, "a book for the householder," but equally valuable to architects and the writers of specifications, to builders, and to others who use painting materials of any sort. It covers glazing, paper hanging, whitewashing, and other operations which ordinarily apply to structures of a residence character. "For every man, woman, and child in this country about two gallons of paint are used every year; and the relative amount is increasing. Paint is a necessity; its use is an economy; it is a means of sanitation; it helps us to keep clean; it keeps us warm in winter and dry in summer; it brings light into dark corners; it raises our assessments; the most ignorant enjoy its benefits; and even the most highly developed people, whose culture is so profound that they have forgotten all they ever learned at college, retain its appreciation. A subject so various in its uses, so universal in its appreciation, deserves attention,—and indeed it merits intelligent study. It is not proposed in this little book to enter largely into the theory of paint manufacture, nor to describe its use for carriage painting and the thousand and one purposes for which special paints and varnishes are made, but to tell simply and plainly the use of preservative coatings of one sort and another for the protection and ornament of common houses, as they are known, or should be, to every one of the author's fellow countrymen. An experience of many years in the manufacture and use of paints and varnishes is the foundation of such knowledge as may be set forth, and while on many points even experts disagree, it will be the intention to set forth fairly sound and safe practice." In 196 pages the author covers all the subjects likely to interest the home owner and deals with them in such a way that scarcely anyone could make a mistake in painting exteriors, interiors, floors or furniture, or in glazing and paper hanging. In fact he even deals with some matters which ordinarily do not concern the home owner. The author dwells sufficiently upon one of the chief of the many functions of paint, which is to act as a preservative, since it spreads over the surface painted a durable film which prevents the penetration of moisture that might cause decay. The use of stains, of course, involves a wholly different result, since the stain penetrates the material, where it is wood, and the coloring produced by the stain cannot be removed, though it may usually be hidden by using over it another stain of a darker color. The work abounds in data.

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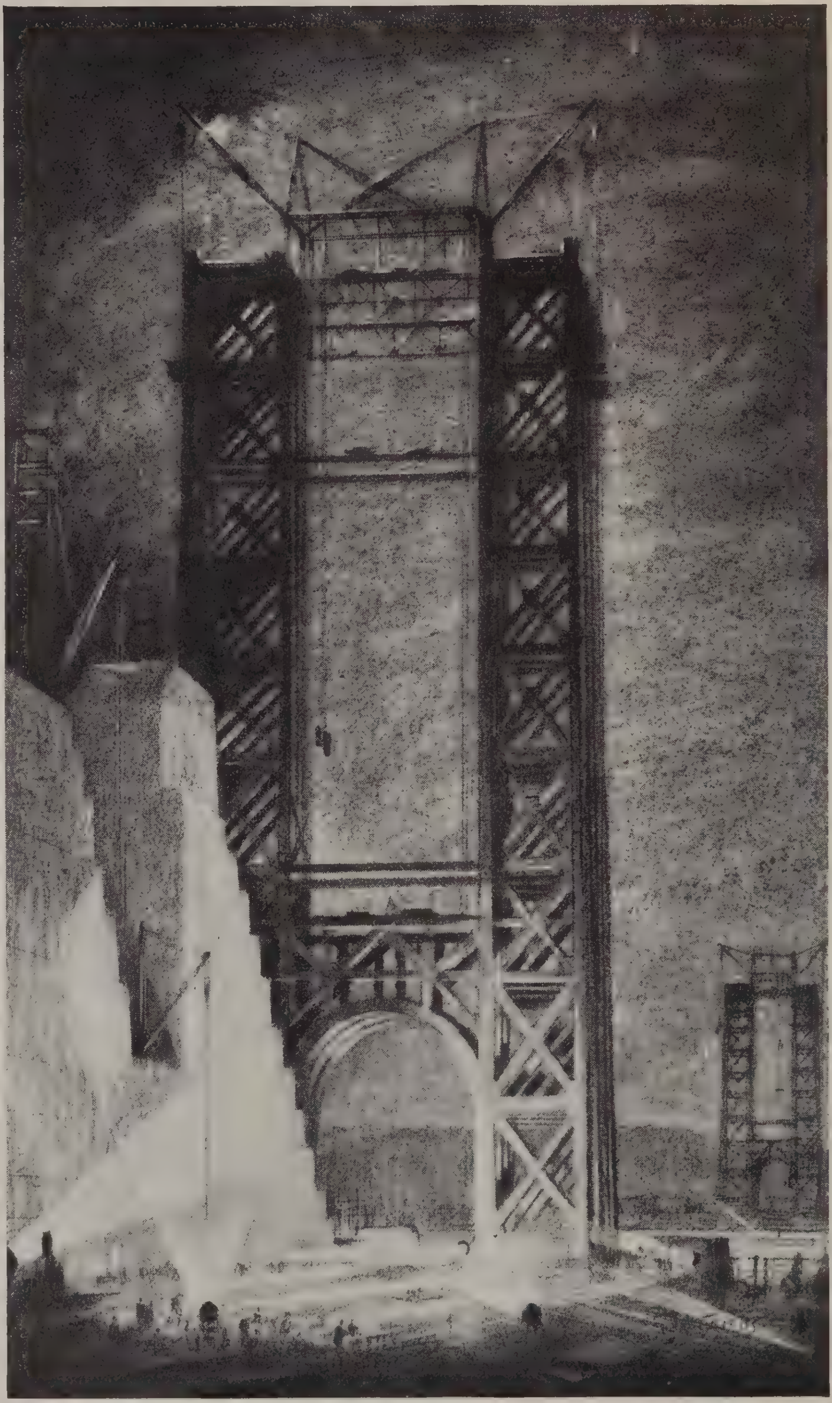

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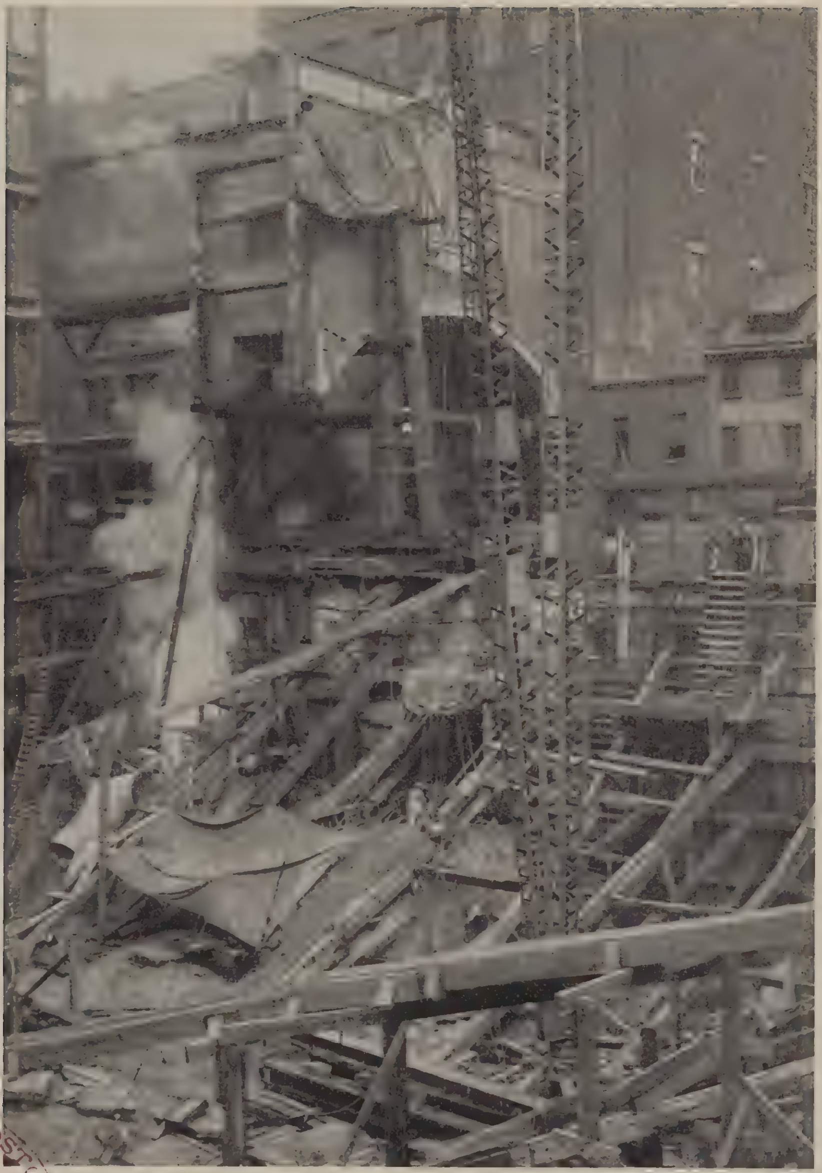

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JUNE 1929

MERCHANDISING AND BUILDING CONSTRUCTION

BY

ARTHUR T. NORTH

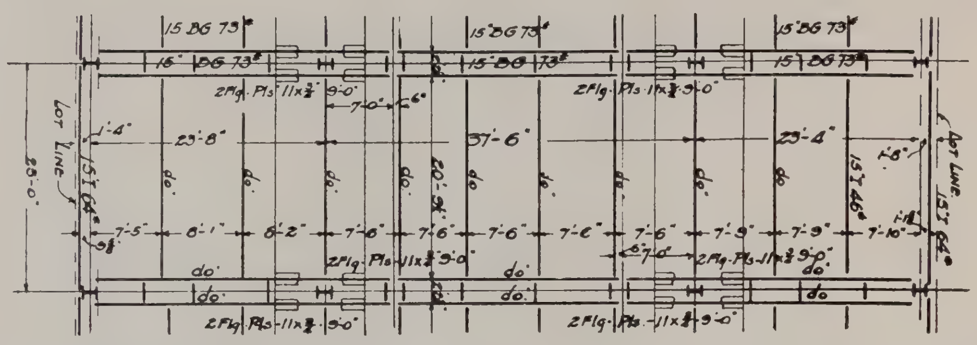
SUCCESSFUL merchandising is dependent upon an increasing and continued patronage due to what is commonly called "consumer loyalty." Patronage is highly susceptible to many influences both favorable and unfavorable. It is the ever-present problem of the merchant to provide favorable and to avoid unfavorable conditions, both of which, in a large degree, are influenced by the character of his building. Occupancy and structure must coördinate to secure maximum utility, and it follows that the necessities of the occupancy will determine the character of the building. The nature of the occupancy must be ascertained first, and merchandising is here defined as a contact between a buyer and a seller of merchandise which results in an exchange. There are certain conditions which facilitate this exchange, and many of them depend upon the character and functioning of the building. Of these, the more important requirements are intended to display the merchandise in a suitable and attractive manner and to provide rapid, comfortable and safe circulation of buyers within the building.

Illumination is one of the most important factors in the proper display of merchandise. The improvement in the design of show windows, show cases and display cabinets has been accompanied by a corresponding improvement in the type and effectiveness of artificial illumination, both resulting largely from the production of more valuable and beautiful merchandise. The general illumination of a store is very important, since it affects the first impression of the buyer upon entering, and it should be of sufficient intensity to produce a cheerful and inviting aspect. This effect is best secured with a high ceiling in which the beam and girder projections are of minimum size or eliminated entirely, and column spacings are made maximum. The general lighting units should be as few in number as possible and of such a kind as to not distract attention from the display plane or level. The specific illumination in show windows, show cases and display cabinets should be of much greater intensity, and the lighting units be concealed. The subordination of structural interferences with the general illumination adds immeasurably to the appearance of spaciousness and dignity of the store.

Buyer traffic is horizontal through aisles and vertical by stairs, ramps, elevators and escalators. Horizontal traffic is the more difficult to make rapid and comfortable because it is in opposite directions within the same aisle. The requisite aisle area is most effectively secured by the maximum elimination of columns and obstructions.

The most important structural features of a merchandising building are the height of the stories, the design of the ceiling, and the spacing and sizes of the columns. Consideration must be given also to the concealing or exposing of the automatic sprinkler system, if it be used. The treatment of these problems in a highly successful manner is illustrated here in their application to three commercial buildings. The mercantile building owned by L. M. Blumstein, Inc., New York, is L-shaped in plan with the principal stem 87′6″ wide and 200′0″ long, with the smaller stem used for the elevators, stairways, toilets and utility shafts and a very considerable display and sales area. The two rows of interior columns in the principal stem are spaced transversely 23′4″, 37′6″, and 23′8″, respectively, where three rows of interior columns would be used ordinarily. In the longitudinal direction the column spacing varies from 23′0″ to 25′0″. The floor panels are generally 23′0″ x 37′6″ and continue through the center of the store. The floor beams are spaced from 7′6″ to 8′2″ on centers and have a depth of 15″. These floor beams cope into and flush with girders of the same depth. These girders are made of two heavy 15″ beams which pass on either side of the interior columns and project 7′0″ beyond the center of the column into the center span, leaving a span of 23′6″ in this span to be filled with two beams of equal size and weight designed as simple beams suspended on the ends of the cantilever girders.

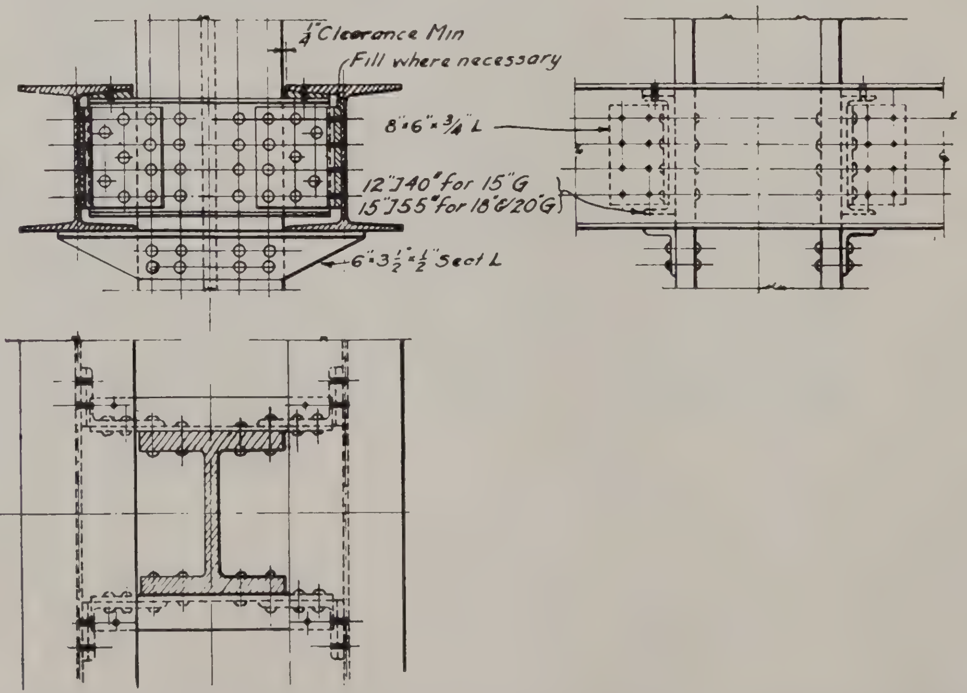
The continuous cantilever girders are each reinforced at the columns by two 9″ x ¾″ x 9′0″ flange plates required to resist the bending mo-



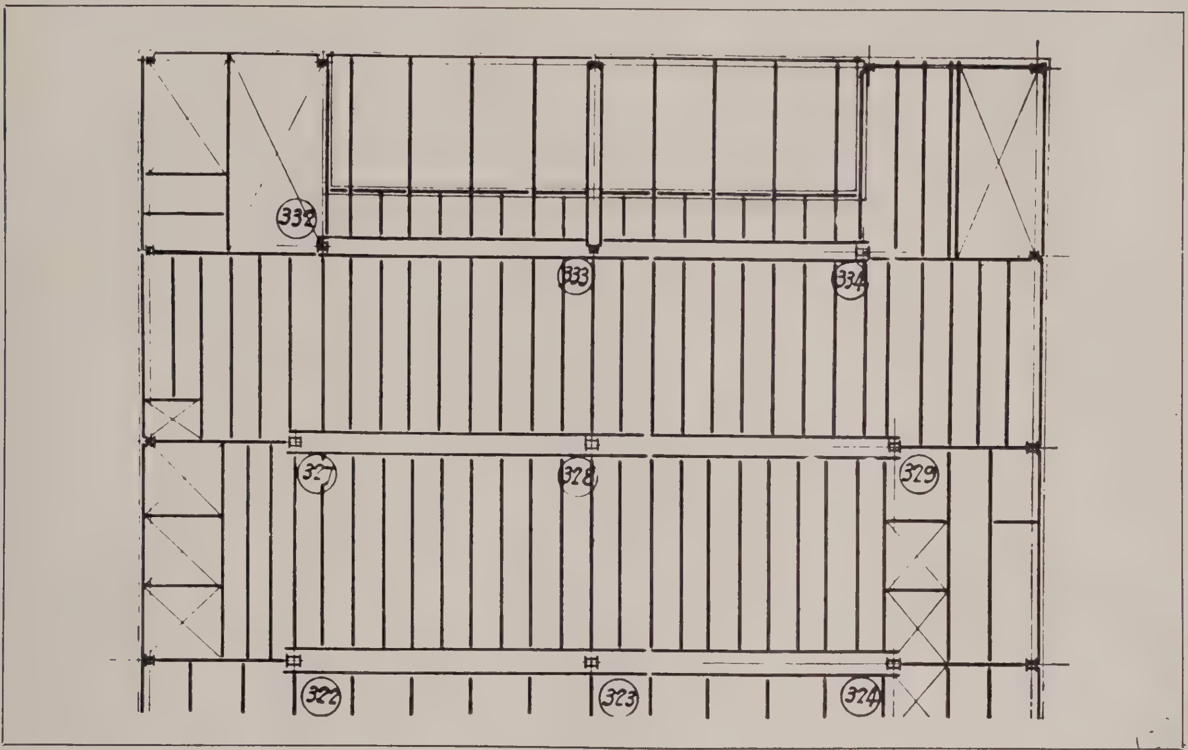
Portion of Plan, Showing Cantilever Type Girder Framing L. M. Blumstein, Inc., Store, New York
Robert D. Kohn and Charles Butler, Architects Associated

ment at place. The girders are supported by channel diaphragms which are riveted to the columns. The spaces between the girders, adjacent to the columns, are utilized for the passage of ventilating ducts, pipes and conduits that are incorporated in the fireproofing of the columns. The uniform depth of the beams and girders makes possible an unbroken ceiling which increases the appearance of spaciousness and aids in the distribution of the illumination. The automatic sprinkler system piping is concealed in the floor construction and is evidenced only by the unobtrusive projection of the inverted heads.

A similar but heavier construction is found in that portion of the store of R. H. Macy & Company, Inc., which was erected in 1923. The ground area covers a space 125′0″ wide and 197′6″ long. The transverse column spacing, east to west, is 18′11″, 41′11″, 40′10″ and 20′0″, and 25′0″ to 30′0″ is the longitudinal column spacing. The narrow side bays are used largely for elevators, escalators and utility shafts. This arrangement provides a central space of about 83′0″ x 195′0″ in which there are only six interior columns, the floor bays being about 30′0″ x 41′0″ in size. In general, the floor beams are 15″ deep, reinforced with 7″ wide coverplates of different thicknesses, and spaced about 8′0″ apart. It was decided to use girders of comparatively small depth so that they would project about 6″ below the suspended ceiling



Details of Typical Connections for Cantilever Construction Shown in the Plan at Top of Page. Seat Angles Are Not Designed to Carry the Load, Which Is Supported by Channel Diaphragms



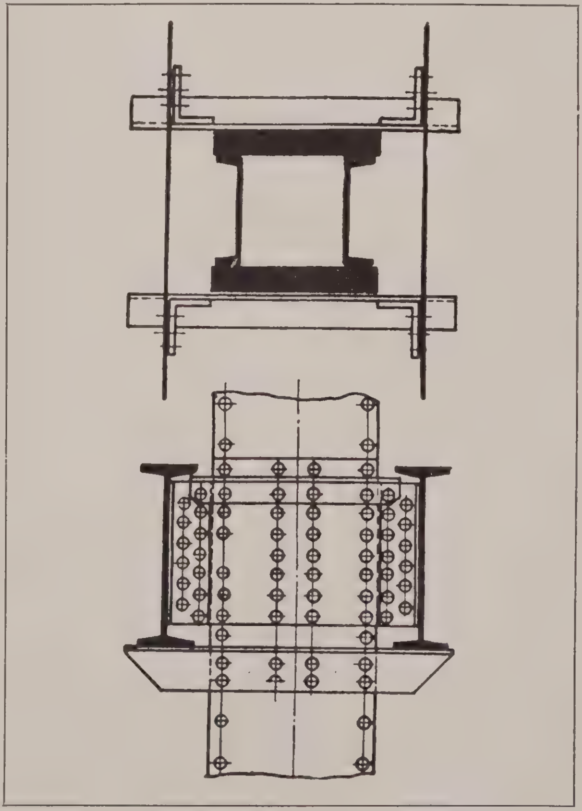
Framing Plan Showing Elevator Shafts; Large Shafts for Motor Truck Elevators, R. H. Macy & Company Store, New York

Robert D. Kohn & Associates, Architects

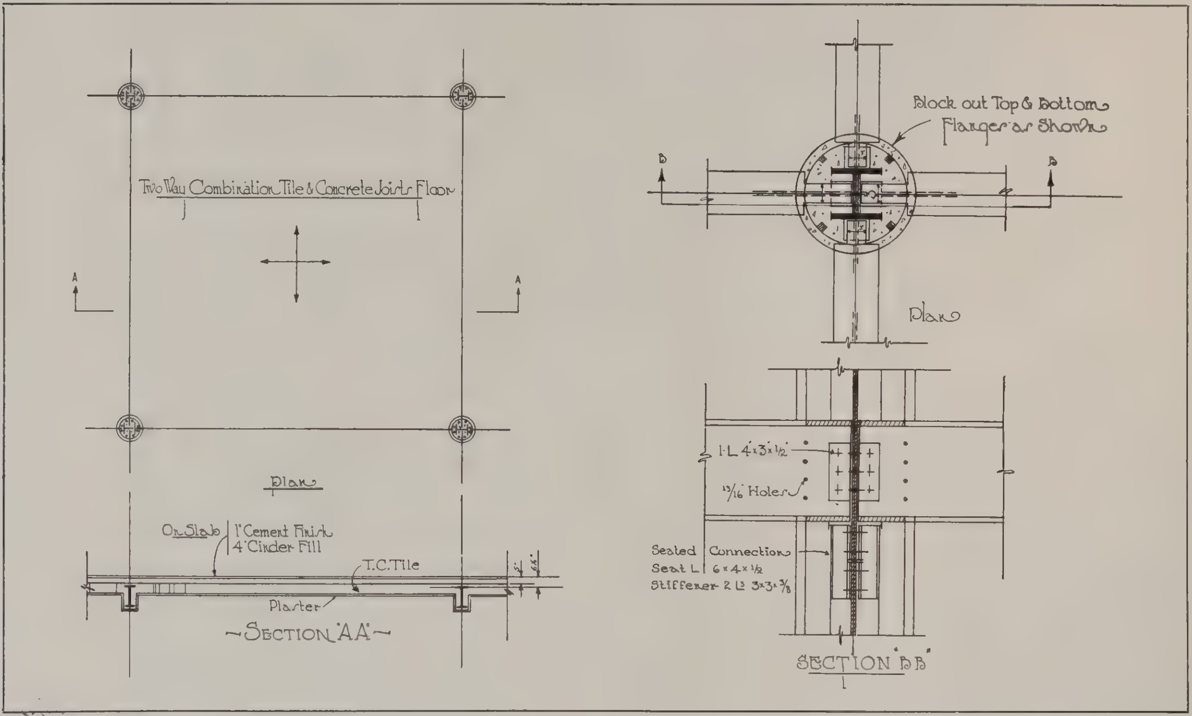
level. These girders are made of two 24″ beams placed on either side of the supporting columns and are 3′1″ apart, center to center. They are reinforced with 10″ wide coverplates of various thicknesses and lengths. Between these girder beams are placed plate and angle diaphragm separators, and the girders are attached to and supported on the columns by a heavy plate and angle diaphragm.

The girder-column connections are designed to take their proportion of the wind-load stresses so as to eliminate many of the undesirable features usually introduced in wind-bracing designs. This type of connection eliminates the usual gusset and angle bracket for large girders. In this building an angle is riveted to the column on which rests the girder for erection purposes only. This type of connection eliminates those structural details which commonly project materially beyond the column and interfere with the architectural treatment of the column head.

There is a cantilever projection of the girders of about 7′9″ beyond the center of the central row of columns, the end of which supports girder beams of similar depth designed as simple beams. Sprinkler mains are passed through holes in the webs of the girders around which suitable reinforcing plates are riveted. A ceiling which conceals all of the horizontal pipes of the automatic sprinkler system, is suspended below the floor beams. The sprinkler heads are inverted in the



Typical Cantilever Connection, R. H. Macy & Company Store. Seat Angles Are Not Figured to Carry Load, Which Is Supported by Plate and Angle Diaphragms



Sections Showing Typical Floor Construction, Columns and Column Connections, Blackmore Danzig Company, Inc., Store, Elmira
Robert D. Kohn and John J. Knight, Architects Associated

usual manner and project below the ceiling. On the ninth, tenth and eleventh floors spaces are allowed for motor truck delivery of merchandise, adjacent to truck elevators. To increase the strength of the floor slabs to support the concentrated loads of the trucks, the floor beams, in general 20" deep without cover plates, are placed more closely together.

The structural frame in each of these buildings is so designed as to contribute a spacious and inviting appearance to the store, and to provide adequate aisle space for the use of customers. The Blumstein building was designed by Robert D. Kohn and Charles Butler, associated, and the Macy building by Robert D. Kohn & Associates.

The store building designed for the Blackmore Danzig Company, Inc., Elmira, N. Y., Robert D. Kohn and John J. Knight, architects associated, is of a different type of construction than the two previously described. This building is irregular in shape, and the floor panels average 20'0" x 20'0" in size. There are no suspended ceilings in this building. The floor framing consists of girders only, which support a two-way combination tile and concrete joist floor construction. On this is placed a cinder fill of sufficient depth to enclose pipes, conduits and other utilities and the floor is finished with a 1" cement top.

The columns are of the combination type with a rolled steel H-shaped core encased in spirally hooped concrete reinforced with vertical bars. In the lower stories the steel core is reinforced with two or four angles riveted to the web. The flanges of the girders extending from the spiral hooping to the column are coped to a width of 3" to permit the satisfactory depositing and rodding of the concrete. The lower tier of columns is in four-story lengths, extending from the basement floor to a point above the fourth floor. These lengths vary from 71'9" to 77'0", with those at the elevator shafts 83'9" long. Three stories and basement are to be first constructed, with provision made for future additional stories. As the steel cores are of uniform section, it necessitated the angle reinforcing in the lower stories as just described. The spiral hooping was slipped over the column in proper sequence before erection and raised and secured in position as the floor girders were erected. These combination concrete and steel columns are designed conforming to the specification of the American Concrete Institute. Eugene W. Stern was associated on all these buildings with the architects, Robert D. Kohn & Associates, as consulting structural engineer.

Merchandising in its many forms is one of the three fundamental elements of commerce which are, in their logical order, manufacturing, transportation and merchandising. They are interdependent, and it is their coincident development that has within a few generations stabilized and expanded American merchandising from that of the pack peddler to the contemporary store.

MECHANICAL EQUIPMENT OF THE DEPARTMENT STORE

BY

E. E. ASHLEY, JR.*

THE store merchant of necessity has recognized the fact that, incidental to the success of his business, the mechanical equipment of his building requires careful design and attention. There is nothing in connection with the mechanical equipment of the modern store building that is a mystery. Consideration must be given to engineering fitness rather than to "sales arguments" when selecting the apparatus and equipment that are required. In building the modern store there are about 50 different mechanical trades to be considered, the major of these being those connected with transportation facilities for persons, packages and cash. These would cover elevators, escalators, spiral chutes, belts and conveyors. Heating and ventilation, sanitation and electrical work are other important considerations. In the modern store building about 30 per cent of the total cost goes into the mechanical equipment, not including in this figure any incidental motorized equipment that goes into the fixturizing; nor does it include the outfitting of such departments as luncheonettes, soda fountains or beauty parlors.

Considering the amount of the investment and the continually increasing cost of labor, it is necessary to conserve every inch of space for selling, and it becomes the duty of the mechanical engineer to think of this in his planning. Too much stress cannot be put on the necessity for providing adequate transportation facilities and proper light and ventilation, for without these the value of the selling space is quickly reduced. It is only within recent years that serious consideration has been given to mechanical equipment.

VERTICAL TRANSPORTATION

The R. H. Macy & Company store, when at 14th Street, New York, had a floor area of approximately 100,000 square feet and used, I believe, eight slow-speed, hydraulic elevators with an average capacity of from 12 to 15 persons. There were, on an average from 20,000 to 25,000 persons entering this store during a busy day, as compared with about 250,000 now entering the present 34th Street store in a similar day. For purposes of determining the transportation facilities, we use the term "transportation area," and this means the area of the building, above or below the first floor, served by elevators and escalators, and used for selling or executive purposes. Until midtown store development, little consideration was given to the scientific study of the transportation problem. The location of entrances, the width of aisles, or the position of elevators was determined more by the architect's ideas of pleasing design than with any thought to the traffic problem. In fact, it has only been quite recently that this problem has been seriously studied.

Again referring to the old Macy store at 14th Street, the sales traffic density for this store was about one person for every 80 square feet of area, whereas, when the 34th Street store was opened, facilities for traffic were based on a density of one person to 32 square feet. This has been gradually increased until today Macy's has facilities for a sales density of about one person to every 19 square feet and, in talking with the managers, it is found to be their belief that they have not as yet reached the density that can be economically handled in their building. It is quite probable that they will increase their transportation facilities in the near future. This is an exceptional example, and it cannot be used as a criterion for estimating transportation facilities necessary for the average store building.

For the general type of department store structure, it is probably safe to assume a density ratio of one person to 25 square feet of transportation area for all floors above the first, and where the basement is used as an under-priced store, a ratio of one person to every 7 square feet. This latter figure is a result of an investigation of the traffic in some of the most successful under-priced basement stores, and it can be assumed to be a proper figure for similar spaces. However, there are many instances where these requirements, owing to the type or the variety of merchandise sold, will not be necessary. For instance, in a specialty shop, or in a store where the average sales check is very high, there will be no necessity of providing transportation facilities for such densities. In the latter type of building, a density ratio of one person to 40 square feet would suffice.

Each store building is a problem in itself, and it requires very careful analysis. The height of the building and the individual floor areas have considerable effect on the individual requirements, and it is not possible to compare the facilities of stores in one city with those in another, because of the fact that the customs of the people or the shopping habits of the people are very often entirely different. Generally speaking, in a well fixtured store, 70 per cent of the entering people will go to the upper floors of the

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Electrical and Mechanical Engineer, Firm of Starrett & Van Vleck

Elevators, La Salle & Koch Department Store, Toledo

Starrett & Van Vleck, Architects

building, and the peak requirements for an hour will be about 20 per cent of the total traffic of the day. The wide-awake merchant is acquainted with the fact that without adequate transportation facilities his store is going to lose trade. Several instances can be given where less than 45 per cent of those entering left the ground floor because of inadequate elevator service. The location of the transportation equipment is as important as the amount of equipment, and to locate elevators or escalators poorly is just as bad as not to provide enough of them. There are instances where buildings are over-equipped with elevators, but where people still complain of the lack of transportation facilities because of the fact that the public cannot find them or because they are so located that only a few of the elevators handle the bulk of the traffic.

There are several important considerations which must be known before the number and the locations of the elevators and escalators can be determined. Among them are:

(a) Type of store.
(b) Character of business.
(c) Relation of building to those of competitors.
(d) Local street traffic conditions.
(e) The general arrangement of selling departments on the upper floors.
(f) Where remodeling or addition to a building is being planned, the traffic count of persons entering the store constitutes a factor.
(g) Where in a new location, the traffic passing the contemplated building plot must be considered.
(h) The percentages of people entering the various entrances.

With these conditions or the majority of them known, it is quite simple to establish the traffic densities, and knowing this, together with the size of the transportation area, the amount of equipment can then be decided upon.

Where to place the elevator equipment is another problem. The size of the plot and the locations of the entrances, which should be placed with adequate regard to street traffic, and even the general arrangement of fixturizing and the locations of the distributory aisles, should be taken into consideration. The positions of the elevators or escalators should be such as to prevent traffic jams resulting in loss of business on the first or the ground floor, and planned with regard to the distance to be traveled from the elevators to the various departments on the upper floors. They should be so located as to be easily seen from the principal entrances. For a rough calculation, a modern type elevator, such as is used in a department store, an elevator having a capacity of about 22 persons, will handle about 400 persons an hour in the average ten-story building, and will take about 4½ minutes for the round trip.

With the total patronage known, it is easy to determine the number of elevator cars needed. For practical reasons, it is not advisable to arrange more than eight cars in one group, and preferably not more than six. When the groups are larger than six, there is too much time lost due to the waiting passengers having to travel from one end of the bank to the other, which, in the case of eight cars, would be approximately 100 feet. This not only delays the elevator service but is vexatious to the customers. Where more than eight cars are necessary, it is advisable to arrange them in two independent banks, and, if the floor area will permit, to arrange these banks or groups facing each other in an alignment. This is not always practical, however, in the shallow or narrow plot.

Escalators. Where more than eight cars are required for passenger service, consideration should be given to the installation of escalators for the efficient handling of the traffic, which then ceases to become a matter purely for elevators and is essentially an escalator problem. Escalators are the most efficient pieces of equipment for handling heavy traffic. For comparison, the elevator handles an average of 400 persons per hour, whereas the escalator, depending on its width, handles from 4,000 to 10,000 persons an hour. When the amount of traffic becomes sufficient to warrant the installation of escalators, it is advisable to assume that 70 per cent of the traffic will be handled by them, and that 30 per cent will use the elevators. The escalator should be located in direct line with the heaviest traffic. The fixture architect will probably criticize this location, since it will break up, to some extent, his arrangement of fixturizing on the first floor, but the escalator, to be efficient, should be so located. Escalators should always be installed in pairs so as to accommodate both up and down traffic. An escalator going in one direction only impairs the general transportation facilities of the building, and instead of reducing the burden on the elevators, it increases it. The general arrangement of escalators should provide for a continual flow of traffic from floor to floor, avoiding the long walk from the head of one escalator to the foot of the next. In other words, if the landing is on the second floor toward the center of the building, the escalator to the third floor should start adjacent to this landing point. There are two ways of accomplishing this,—by using either the "scissor" type or the "parallel" type, the latter being in the center of the area or else in between two sets of machines. Where local laws do not make it obligatory to enclose the escalator, it should be left open so as to give the customer every opportunity to look over the selling area. Where it is necessary to enclose the escalator, as much glass as will be permitted should be employed.

Elevator Cabs and Equipment. The size of the elevator cabs is important. They should be shallow and wide; preferably about three fifths as deep as they are wide, and the doors should be center-opening so as to permit the largest possible entrance for quick loading and unloading. The doors should be about four fifths of the total width of the car. This will permit a return on the car for the operator's position. The gates on the car should likewise be center-opening, and, with the modern type of elevator, with its automatically-controlled levering, the doors and the gates should be power-actuated and automatically-controlled so as to open on the arrival of the car and close on its departure.

Too much care cannot be taken in the selection of elevator equipment, for there is no demand on elevator service as severe as that of the department store. High speed is not essential, but speeds between 400 and 500 seem advisable. Of course, this is based on the assumption that the average mercantile building is not over ten stories high. Taking into consideration the type of service and the speeds to be maintained, the gearless machine is the most suitable and, with the adoption of variable voltage, it can be used irrespective of the type of electric current provided.

Elevator Arrangement, Kresge Department Store, Newark

Starrett & Van Vleck, Architects

The question of service in store elevators is one that can be answered only by careful study of the individual requirements of the building, for there are so many different methods being employed in the warehousing and storing of stock, and in the handling of incoming and outgoing merchandise and freight, that no set rules can be made for this type of service. Where the customer traffic is handled by elevators alone, it is essential that some cars be provided to handle employes. These same cars can be utilized for the carrying of stock merchandise. The freight cars should be so located as to handle the freight with despatch from the point of entrance to the receiving and marking rooms, and should be liberal in size and capacity. While no set rule can be made for the type of equipment to be used for this service, it is advisable and most practical to standardize on the type of equipment, and to equip all service and store elevators so that they can, in emergency, handle passenger traffic.

HEATING AND VENTILATING

With the planning of the large store building, the problem of ventilation becomes serious, particularly as the basements and first floors are practically hermetically sealed. The two elements which probably cause more fatigue and nervousness, not only to the customer but to the worker as well, are improper ventilation and improper lighting. With the general arrangement of the ground floor, having show windows and en-

Elevators, Davison-Paxon Co., Atlanta
Starrett & Van Vleck, Architects
Hentz, Reid & Adler, Associated

trances practically closing up the entire periphery of the structure, the only practical way of taking care of the ventilation of the selling space is to supply fresh air mechanically. The air is the medium for heating this space in the winter and for cooling the area in the summer.

Duct Work. How to provide space for the ventilating ducts must be carefully studied so as to avoid the loss of valuable selling space. Very often ducts above the show windows for handling the fresh air, and exhaust ducts located in the stock cases can be so installed as to make a very good arrangement. With the introduction of air-conditioning or cooling for the summer, it is necessary to re-circulate approximately 60 per cent of the air, thus requiring considerable additional duct work to bring all the ducts back to the fan rooms. These latter ducts, of necessity, could be run on the ceiling of the basement. There is an objection to this, however, in that every foot added to the thickness of the first floor means that the customers going to the basement have to travel that additional distance. In some instances it has been found practical to excavate below the basement and to run all the ducts in tunnels below the floor; then to have them come up on the columns or sidewalks to the ceiling of the first floor.

The tendency in the most recently planned buildings is to provide air-conditioning equipment to condition the air of the first floor and basement and, in some instances, also to condition the air in beauty parlors and restaurants. It is my decided opinion that this is only the beginning of the application of air conditioning in store buildings, and I believe that within the next ten years store buildings will be air-conditioned throughout. Where air conditioning has been installed, it has been found that there is less fatigue or illness among the workers, and that there is actually more merchandise being sold. People are sure to go to the building in which it is most comfortable to shop. The problem of the ventilation of the average first floor and basement is affected by the traffic as well as by the tremendous amount of heat given off by both the general lighting and the lighting of show cases. The fresh air inlet is very often carried to the roof and, if not properly located, pulls down fumes and smoke from adjacent chimneys.

Vestibules. The problem of the heating of the vestibules is very difficult. With the amount of traffic coming in and going out, it is almost impossible, without the use of revolving doors, to prevent the inrush of cold air from the street. In the middle west practically all of the store buildings are so equipped. With the use of the revolving door, the depth of the vestibule can be materially reduced. There are some criticisms, however, as to their use, the principal objection being the inconvenience to women with children and to those carrying packages. They reduce or regulate the amount of traffic to be handled during a given time, the average revolving door handling about 1,500 persons per hour.

Where revolving doors are not used, probably the best method of handling the problem is to make the vestibule as large as possible with three sets of doors, and to provide a hot-blast system of heating. The larger the vestibule, the simpler becomes the heating problem. It will simplify the problem if the interior set of doors does not parallel the entering doors. In other words, they can be set at an angle so as to deflect the inrush of air drafts. If this cannot be done, it is advisable to arrange them so that screens can be put directly inside of the vestibule.

Thermostatic Control. With the ever-increasing cost of fuel and labor, careful study of the heating requirements should be made. It will probably be found economical, especially in larger stores, to provide thermostatic control of the direct radiation for the heating of the upper floors and for the control of the tempered air for the first floor and basement. With the large areas above the first floor, it is very often necessary to provide exhaust ventilation for the interior sections, for it will be found that due to lack of circulation the air may become quite foul. All boiler rooms, locker rooms and workrooms should be thoroughly ventilated by mechanical means; irrespective of how many windows there are, they will not be opened in the cold months.

If street steam is available, there is the question of whether or not it is advisable to install a boiler plant, with the high cost of fuel, the high cost of labor, and the inconvenience of handling fuel etc., together with the value of the space necessary. It then becomes an economic problem whether it is not advisable to abandon the use of a plant and to utilize the street service. Each individual case, however, must be worked out on the basis of its particular conditions.

The arrangement of utilities, such as electric control panels on various floors, the sprinkler control valves, clocks, dismissal and executive calls, needs careful thought. One of the most practical plans seems to be to use a shaft adjacent to the stairways, and to place the electric panel inside so as to be accessible from the selling area of the department store. It is also well to provide a cabinet with a glass door in the stairway, and to place in the cabinet the hose outlet, fire extinguisher and sprinkler control valve.

Elevator Machinery, Saks-Fifth Avenue, New York
Starrett & Van Vleck, Architects

THE SPRINKLER SYSTEM

The purpose of a sprinkler installation is to afford protection against fire, and it should be so considered. It is not purely a means of reduction in insurance rate, but for the protection against interruption of business. Care should be taken in planning sprinkler piping to avoid all unnecessary, excessively long runs, offsets and other complications which reduce the effectiveness of the system. The "wet" type system should never be installed in any location where there is even a remote chance of its freezing. Often the unexpected happens, and either the system is ineffective in case of fire or a heavy water damage results when the frozen water thaws out. The system is widely used, generally perhaps because a dry system cannot be run concealed, as is the practice in better buildings.

The present tendency is to conceal all sprinkler piping. Generally these pipes are run in behind the furred ceiling; occasionally they are run in the floor fill. The latter method should not be encouraged, as it is very difficult to maintain piping, and the method does not lend itself to expansion or alteration. To avoid excessive furring, the girder beams are drilled so that the sprinkler pipes may pass through them. Sometimes considerable objection is raised to the use of dry systems in show windows, which is required owing to the likelihood of sprinklers of the wet type freezing in unprotected or unheated windows. The architect claims that the exposed piping ruins his decorative ceiling. By careful arrangement of heads and piping, however, they can be so placed as to make their detection difficult. In fact, how many persons looking at a show window can tell the kind of ceiling, or whether or not there are pipes in it?

The sprinkler system requires considerable water storage in tanks of the pressure type, which can be placed in the penthouse adjacent to the elevator equipment. This is preferable to using the ugly gravity type placed above the building, which is not only unsightly but difficult to maintain. The layout of sprinkler systems must be flexible to permit of adjustment for the rearrangement of partitions, the location of belts, conveyors and similar equipment, and it is advisable, in sizing the piping, to take these factors into consideration. There should be a special arrangement for flooding such places as rubbish and wastepaper chutes, ammonia compressor rooms, etc., and to amply protect the paper-sorting, packing-paper and excelsior storage houses, so that in case of fire the smoke will not penetrate to the rest of the building. It would seem desirable to use on the doors to such rooms thermal releases so that a sudden change in room temperature would immediately close the doors, rather than to use the somewhat old type fuse link which takes more time before acting. The thermal release is a very good device to use in connection with the doors at the head of escalator enclosures. This allows of the doors being automatically held open, and closed in case of danger,—allowing free access at all times.

Fire Protection. The general protection of all connecting openings between floors is important, as this is one of the sources of much trouble and raises the insurance rate. This applies particularly to the sheet metal duct work of the ventilating systems, which should always be provided with fire dampers where they go from one fire area to another. The shafts for piping and electric raceways for pneumatic tubes or plumbing stacks should be ample in size to allow ready access to all pipes, but they should be protected by fire cutoffs if a severe penalty in size of insurance rates is to be avoided. Care must also be exercised in the construction of elevator shafts and the doors of such enclosures. Some underwriters require vent openings from the tops of the shafts if they are cut off from the machine rooms by concrete slabs, which, of course, is a necessity with modern chemical equipment.

CONVEYORS AND PNEUMATIC TUBES

The question is often raised as to why one should include such equipment as conveyors, belts and pneumatic tubes in general construction work. The answer is that for all of these kinds of work certain clearances, shafts, and arrangements of openings in floors, and sometimes the shifting of structural members of the building require checking, and in order to avoid confusion, delay and unnecessary changes in other kinds of mechanical work, it is wise to have it designed and installed with the general construction, putting the responsibility for piping installation up to the general contractor.

Pneumatic Tube Room, Davison-Paxon Co.
Starrett & Van Vleck, Architects
Hentz, Reid & Adler, Associated

Tube Room, Halle Brothers Company Department Store, Cleveland
Walker & Weeks, Architects

Whether the building should have a pneumatic tube system or a cash register system depends entirely on the wishes of the management. However, irrespective of the system selected for the financial transactions, there is still a large field for the use of the pneumatic tube in the transmission of messages, orders or correspondence, and it will pay for its installation cost in the reduction in the number of messengers required and in time saved. The general tube used in department store service is 2¼ inches in diameter, but for messenger service tubes as large as 4 inches by 7 inches may be used. These will handle carriers which, when loaded, weigh about 14 pounds. There are a great many applications of the tube system to reducing operation costs.

The pneumatic tube system requires the installation of tubes to the various departments and counters. These terminate in a central station, which is divided into two parts,—one for handling cash transactions and the other for credit authorization. Sometimes the credit section of the desk is placed at a distance from the cash section. That is, it may be in the credit department, which is placed on an upper floor of the building. Generally, for the most rapid service, the cash desk is located on the basement floor or as near the first floor as possible to minimize the travel of the carriers from the first floor stations. There are many points in favor of this system: that of central control of all cash; silent authorization; and the saving in the work of cashiers. There is also the fact that with tubes there are many other services to which they can be put,—for orders and messenger service. In some stores there is a combination system, using the tube system throughout and supplementing it with cash registers convenient for the very active sections in the under-priced shops and first floors.

Merchandise Handling. The merchant of today is watching carefully every improvement which will reduce operating costs, particularly in the handling of in- and out-going merchandise. The problem of handling merchandise will vary according to the location of the building. In some locations, the bulk of the merchandise is received from the railroad freight yard or dock. In others, it is delivered from the manufacturer's or jobber's warehouse or from the merchant's own warehouse, and the facilities for handling the merchandise will vary. The elevator equipment must be proportioned accordingly. A little care in arranging the size of an elevator will not only add to the efficiency of operation, but to the economy of space as well.

The majority of store owners use the upper floors of buildings for receiving, re-marking and stocking merchandise, except where the stock is carried in warehouses. This means that all the merchandise must be transferred from the stockrooms to various departments throughout the building. This distribution may be handled by elevators, dumbwaiters and spiral chutes, or, generally, by a combination of elevators and spirals. In some cases dumbwaiters are used in place of spiral chutes. The objection is sometimes made that merchandise may be damaged in a spiral chute. This may be true if the merchandise is sent down in a carton box without first being placed in a container or a bag to protect it against the rubbing it would receive while passing down the chute. Some chutes have been designed with what are known as "switch outlets" on several floors, and should a package hit one of these, it is very likely to become damaged. It is possible, however, to design a chute with as many as three blades, allocating the blades to various floors. Properly designed chutes may be very effective, and require little or no maintenance or operating power. Bulk merchandise is generally handled on wheelers or in hampers on the merchandise elevators.

Stockroom and Delivery. There is a growing tendency, owing to the value of space in the store building, to reduce stockroom areas to a minimum, carrying all merchandise in the warehouse, and shipping or delivering from the warehouse all merchandise except that which the customers take with them. Practically all furniture and household supplies are shipped by this method, only samples being kept in the store. This system materially simplifies the delivery problem from the store.

The problem of handling the out-going or sold merchandise involves several problems,—that of checking, authorizing (if on a charge account basis), wrapping, routing, and delivering. There are two methods of handling the out-going merchandise: one where the packages are clerk-wrapped (wrapped by the clerk selling the merchandise); and the other where they are central-wrapped. Where the latter system is used, the bulk of the merchandise is sent, after its sale, to a central wrapping department. With this system, of course, there is a certain amount of merchandise taken out by customers which, of necessity, is clerk-wrapped. Generally all merchandise on the first floor is central-wrapped with the exception of that taken out by the customer. The packages from the first floor are collected on belts which are hung from the basement ceiling and connected with a tube or cash desk in the rear fixture in the accounting department or square. With the central-wrapped system, the merchandise is gathered in hampers, bags or baskets and sent to the central-wrap. Where china and glassware are sold, it is very often arranged so that the packing accommodations, to-

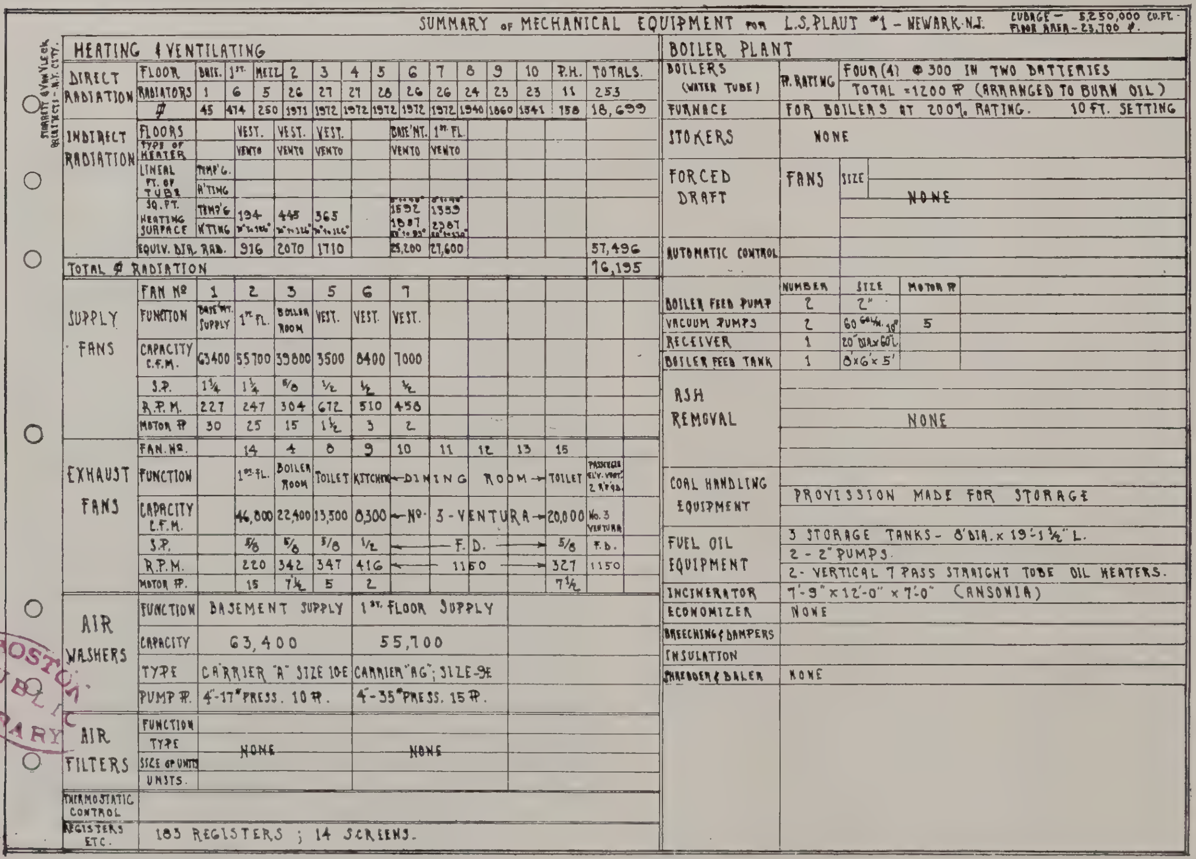
Package Delivery Room, Davison-Paxon Co.
Starrett & Van Vleck, Architects
Hentz, Reid & Adler, Associated

gether with excelsior vaults, are located adjacently to the department, thereby reducing, to a minimum, the amount of breakage. Where furniture is carried and shipped from a store, the finishing and packing room is likewise located adjacently to the department. The tendency, however, is to handle as much as possible of bulk material directly from the warehouse, selling from samples entirely.

Delivery Cars. With the increasing restrictions governing the system of using streets for the parking of automobiles, it becomes necessary to either resort to the route delivery system, or to arrange it so that delivery cars may be taken directly within the building and loaded there. A New York department store uses a system in which the cars are all fitted with cartons just the size of the bodies of the cars. These cartons are unloaded onto special elevators which carry them to the delivery concourse within the building for loading and unloading. Generally these are left in the evening, and the car is sent to the garage. In the morning the car calls and collects the carton, which, in the meantime, has been loaded and is waiting to be delivered.

Package Routing. In collecting packages from the first floor, instead of using messengers and porters, a series of belts is provided on the basement ceiling. These belts are connected with the wrapping or cash desk in each department. After the packages have been wrapped and addressed, they continue on a belt to the inspection and authorization department, and then on to the routing table, where the delivery route number is placed on each package. From there they are tossed onto the delivery belt and then go to the sheet writers' bin, where the delivery sheets are written up. From here they are passed on to the delivery bin to be loaded onto the delivery truck. The packages from the upper floors of the building are generally placed in a delivery blade of the spiral chutes, which discharge on belts and are carried to the central wrapper, following the same route as that for the first floor. For large organizations, where there are many packages, it is the practice to provide two sets of blades in the spiral chutes,—one for semi-wrapped and one for wrapped packages,—so that the wrapped packages are taken direct to the authorizing and writing tables. Mail and express packages are separated at this table.

The question of the value of space used for delivery equipment has caused several stores to remove it entirely from their buildings, using in-



SUMMARY OF MECHANICAL EQUIPMENT FOR L.S. PLAUT #1 - NEWARK-N.J. CUBAGE — 5,250,000 CU.FT. FLOOR AREA — 23,700 #.

STARRETT & VAN VLECK ARCHITECTS - N.Y. CITY.

HEATING & VENTILATING

DIRECT RADIATION	FLOOR	BASE.	1ST.	MEZZ.	2	3	4	5	6	7	8	9	10	P.H.	TOTALS.
	RADIATORS	1	6	5	26	27	27	28	26	26	24	23	23	11	253
	#	45	414	250	1971	1972	1972	1972	1972	1972	1940	1860	1541	158	18,699

INDIRECT RADIATION													
FLOORS			VEST.	VEST.	VEST.		BASE'MT.	1ST FL.					
TYPE OF HEATER			VENTO	VENTO	VENTO		VENTO	VENTO					
LINEAL FT. OF TUBE	TEMP'G.												
	H'TING												
SQ. FT. HEATING SURFACE	TEMP'G		194	445	365		1592	1339					
	H'TING						1887	2387					
EQUIV. DIR. RAD.			916	2070	1710		25,200	27,600					57,496
TOTAL # RADIATION													76,195

SUPPLY FANS							
FAN No	1	2	3	5	6	7	
FUNCTION	BASE'MT. SUPPLY	1ST FL.	BOILER ROOM	VEST.	VEST.	VEST.	
CAPACITY C.F.M.	63400	55700	39800	3500	8400	7000	
S.P.	1¼	1¼	5/8	½	½	½	
R.P.M.	227	247	304	672	510	458	
MOTOR HP	30	25	15	1½	3	2	

EXHAUST FANS											
FAN. No.		14	4	8	9	10	11	12	13	15	
FUNCTION		1ST FL.	BOILER ROOM	TOILET	KITCHEN	← DINING		ROOM →		TOILET	PASSENGER ELV. VENT. 2 R'Q'D.
CAPACITY C.F.M.		46,800	22,400	13,500	8,300	← No. 3 -	VENTURA →			20,000	No. 3 VENTURA
S.P.		5/8	5/8	5/8	½	← F. D. →				5/8	F.D.
R.P.M.		220	342	347	416	← 1150 →				327	1150
MOTOR HP.		15	7½	5	2					7½	

AIR WASHERS			
FUNCTION	BASEMENT SUPPLY	1ST FLOOR SUPPLY	
CAPACITY	63,400	55,700	
TYPE	CARRIER "A" SIZE 10-E	CARRIER "AG"; SIZE-9E	
PUMP HP.	4"-17" PRESS. 10 HP.	4"-35" PRESS. 15 HP.	

AIR FILTERS			
FUNCTION			
TYPE	NONE	NONE	
SIZE OF UNITS			
UNITS.			

THERMOSTATIC CONTROL	
REGISTERS ETC.	183 REGISTERS ; 14 SCREENS.

BOILER PLANT

BOILERS (WATER TUBE)	HP. RATING	FOUR (4) @ 300 IN TWO BATTERIES TOTAL = 1200 HP (ARRANGED TO BURN OIL)		
FURNACE	FOR BOILERS AT 200% RATING. 10 FT. SETTING			
STOKERS	NONE			
FORCED DRAFT	FANS	SIZE	NONE	
AUTOMATIC CONTROL				
	NUMBER	SIZE	MOTOR HP	
BOILER FEED PUMP	2	2"		
VACUUM PUMPS	2	60 GAL/M. 10"	5	
RECEIVER	1	20" DIA × 60" L		
BOILER FEED TANK	1	8'×6'×5'		
ASH REMOVAL	NONE			
COAL HANDLING EQUIPMENT	PROVISSION MADE FOR STORAGE			
FUEL OIL EQUIPMENT	3 STORAGE TANKS - 8' DIA. × 19'-1½" L. 2 - 2" PUMPS. 2 - VERTICAL 7 PASS STRAIGHT TUBE OIL HEATERS.			
INCINERATOR	7'-9" × 12'-0" × 7'-0" (ANSONIA)			
ECONOMIZER	NONE			
BREECHING & DAMPERS				
INSULATION				
SHREDDER & BALER	NONE			

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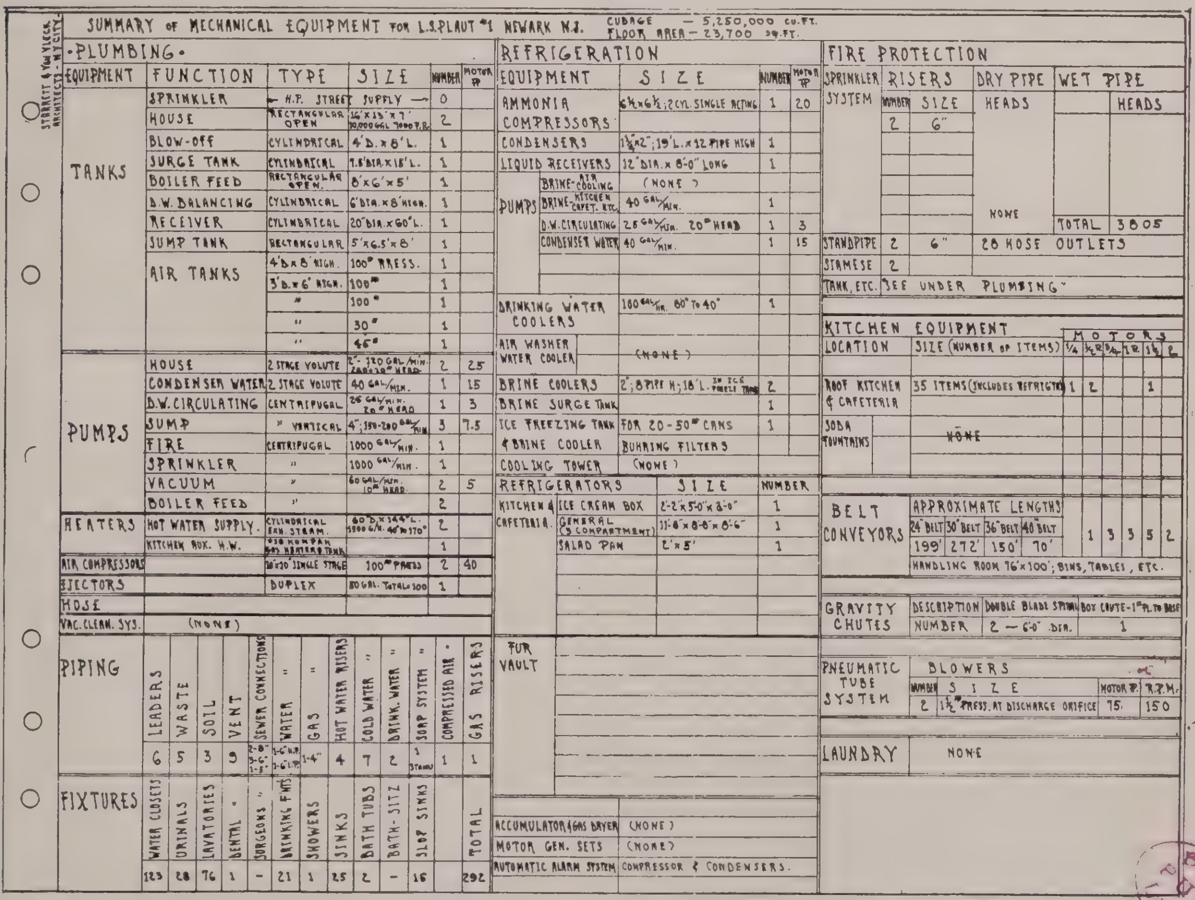
Summary Charts of Mechanical Equipment Are Useful Records stead delivery stations located in the various delivery centers. With this system, the merchandise is loaded at the store in hampers, trunks, and, in some few instances, directly in rolls which are transferred to the delivery stations. With any of these route systems, additional elevators will be required to handle the packages. For the handling of furniture and pianos, where they are carried in the building, it is sometimes advisable to provide a van elevator, which will be large enough to bring a furniture van directly into the furniture department, where the furniture may be loaded directly into or out of the van. Whether this method is economical, considering the cost and amount of valuable floor space it occupies, is debatable.

Waste Handling. The problem of handling waste paper, boxes and rubbish is one which requires some thought. It is sometimes possible to sell this refuse, but often it costs more to prepare it for sale than the amount obtained. It is therefore quite possible that a waste incinerator or boiler may be considered as part of the store equipment. In many instances, it has been found that the hot water requirements, and sometimes sufficient steam, can be generated for the cafeteria kitchen from the refuse which would otherwise have to be carted away at expense to the store. To collect the paper and refuse, it is advisable to provide chutes running through the building, with hopper doors on each floor. In large buildings, it is advisable to provide separate chutes for paper and rubbish, carrying the refuse to separate sorting or accumulation rooms. Very often a shredding machine may be installed, and some of the paper may be shredded and recovered for packing purposes. The chutes and sorting rooms should be protected against fires, for these are among the places in a building where fires occur more frequently than anywhere else. For wooden crates a machine called a "hogger" is sometimes installed to break up boxes, and they are then fed directly to the incinerator.

Incinerators. It is important, in the selection of an incinerator, that all the facts as to quantity and type of rubbish to be burned, and what the waste is to be used for, be known, for without full information serious difficulties will follow.

Fur Storage. The handling and the storage of furs in the modern store building require considerable thought, for here is a value which must be protected not only against fire and theft, but



STARRETT & VAN VLECK ARCHITECTS - N.Y. CITY.

SUMMARY OF MECHANICAL EQUIPMENT FOR L.S.PLAUT #1 NEWARK N.J. CUBAGE — 5,250,000 CU.FT. FLOOR AREA — 23,700 SQ.FT.

·PLUMBING·

EQUIPMENT	FUNCTION	TYPE	SIZE	NUMBER	MOTOR HP
TANKS	SPRINKLER	← H.P. STREET	SUPPLY →	0	
	HOUSE	RECTANGULAR OPEN	16'x13'x7' 10,000 GAL. 7000 F.R.	2	
	BLOW-OFF	CYLINDRICAL	4' D. x 8' L.	1	
	SURGE TANK	CYLINDRICAL	7.5' DIA. x 15' L.	1	
	BOILER FEED	RECTANGULAR OPEN.	8'x6'x5'	1	
	D.W. BALANCING	CYLINDRICAL	6' DIA. x 8' HIGH.	1	
	RECEIVER	CYLINDRICAL	20" DIA. x 60" L.	1	
	SUMP TANK	RECTANGULAR	5'x6.5'x8'	1	
	AIR TANKS	4' D. x 8' HIGH.	100# PRESS.	1	
		3' D. x 6' HIGH.	100#	1	
		"	100#	1	
		"	30#	1	
		"	45#	1	
PUMPS	HOUSE	2 STAGE VOLUTE	2"- 320 GAL./MIN. 280+30" HEAD	2	25
	CONDENSER WATER	2 STAGE VOLUTE	40 GAL./MIN.	1	15
	D.W. CIRCULATING	CENTRIFUGAL	25 GAL./MIN. 20# HEAD	1	3
	SUMP	" VERTICAL	4"; 150-200 GAL./MIN.	3	7.5
	FIRE	CENTRIFUGAL	1000 GAL./MIN.	1	
	SPRINKLER	"	1000 GAL./MIN.	1	
	VACUUM	"	60 GAL./MIN. 10# HEAD.	2	5
	BOILER FEED	"		2	
HEATERS	HOT WATER SUPPLY.	CYLINDRICAL EXH. STEAM.	60" D. x 144" L. 1500 G/H. 40° to 170°	2	
	KITCHEN AUX. H.W.	#30 HUMPHREY GAS HEATER & TANK		1	
AIR COMPRESSORS		16"x20" SINGLE STAGE	100# PRESS	2	40
EJECTORS		DUPLEX	80 GAL. TOTAL 300	1	
HOSE					
VAC. CLEAN. SYS.	(NONE)				

PIPING	LEADERS	WASTE	SOIL	VENT	SEWER CONNECTIONS	WATER "	GAS "	HOT WATER RISERS	COLD WATER "	DRINK. WATER "	SOAP SYSTEM "	COMPRESSED AIR "	GAS RISERS
	6	5	3	9	2-8" 3-6" 1-5"	1-6" H.P. 1-6" L.P.	1-4"	4	7	2	1 STAND	1	1

FIXTURES	WATER CLOSETS	URINALS	LAVATORIES	DENTAL "	SURGEONS "	DRINKING F'NTS	SHOWERS	SINKS	BATH TUBS	BATH-SITZ	SLOP SINKS		TOTAL
	123	28	76	1	-	21	1	25	2	-	16		292

REFRIGERATION

EQUIPMENT		SIZE	NUMBER	MOTOR HP
AMMONIA COMPRESSORS		6¼x6½; 2 CYL. SINGLE ACTING	1	20
CONDENSERS		1¼"x2"; 19' L. x 12 PIPE HIGH	1	
LIQUID RECEIVERS		12" DIA. x 8'-0" LONG	1	
PUMPS	BRINE-AIR COOLING	(NONE)		
	BRINE-KITCHEN CAFET. ETC.	40 GAL./MIN.	1	
	D.W. CIRCULATING	25 GAL./MIN. 20# HEAD	1	3
	CONDENSER WATER	40 GAL./MIN.	1	15
DRINKING WATER COOLERS		100 GAL./HR. 80° TO 40°	1	
AIR WASHER WATER COOLER		(NONE)		
BRINE COOLERS		2"; 8 PIPE H.; 18' L. IN ICE FREEZE TANK	2	
BRINE SURGE TANK			1	
ICE FREEZING TANK		FOR 20-50# CANS	1	
& BRINE COOLER		BUHRING FILTERS		
COOLING TOWER		(NONE)		

REFRIGERATORS		SIZE	NUMBER
KITCHEN & CAFETERIA.	ICE CREAM BOX	2'-2"x5'-0"x3'-0"	1
	GENERAL (3 COMPARTMENT)	11'-6"x8'-6"x8'-6"	1
	SALAD PAN	2'x5'	1

FUR VAULT

ACCUMULATOR & GAS DRYER	(NONE)
MOTOR GEN. SETS	(NONE)
AUTOMATIC ALARM SYSTEM	COMPRESSOR & CONDENSERS.

FIRE PROTECTION

SPRINKLER SYSTEM	RISERS NUMBER	RISERS SIZE	DRY PIPE HEADS	WET PIPE	WET PIPE HEADS
	2	6"	NONE	TOTAL	3805
STANDPIPE	2	6"	28 HOSE OUTLETS		
SIAMESE	2				
TANK, ETC.	"SEE UNDER PLUMBING"				

KITCHEN EQUIPMENT

LOCATION	SIZE (NUMBER OF ITEMS)	MOTORS ¼	½ HP	¾	1 HP	1½	2
ROOF KITCHEN & CAFETERIA	35 ITEMS (INCLUDES REFRIG'TRS)	1	2			1	
SODA FOUNTAINS	NONE						

BELT CONVEYORS	24" BELT	30" BELT	36" BELT	40" BELT	¼	½ HP	¾	1 HP	1½	2
APPROXIMATE LENGTHS	199'	272'	150'	70'		1	3	3	5	2
	HANDLING ROOM 76'x100'; BINS, TABLES, ETC.									

GRAVITY CHUTES			
DESCRIPTION	DOUBLE BLADE SPIRAL	BOX CHUTE-1st FL. TO BASE	
NUMBER	2 — 6'-0" DIA.	1	

PNEUMATIC TUBE SYSTEM — BLOWERS

NUMBER	SIZE	MOTOR HP	R.P.M.
2	1½" PRESS. AT DISCHARGE ORIFICE	75	150

LAUNDRY — NONE

This Continues the Summary for the Kresge Department Store, Newark

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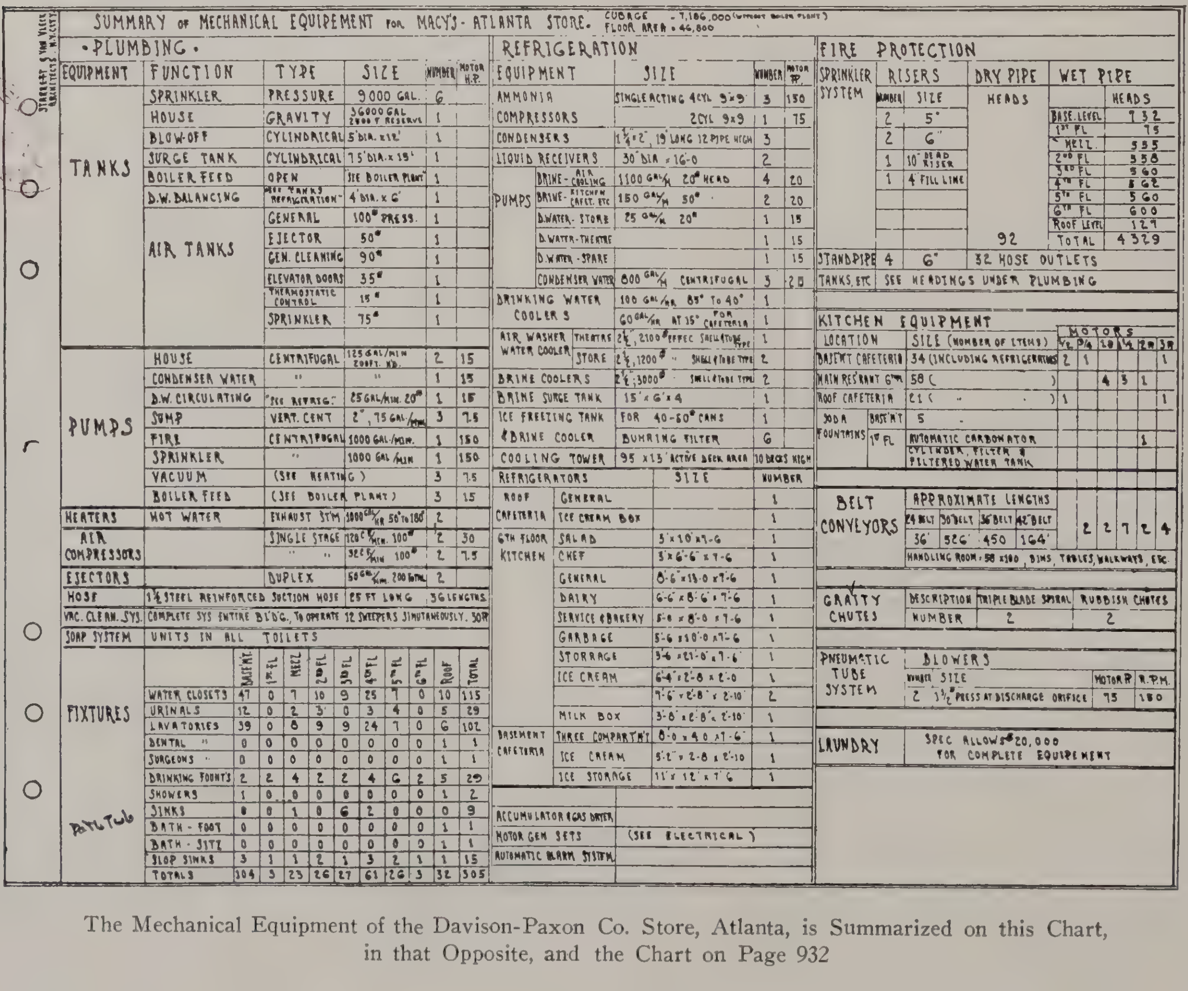
from moths. There are two systems used in the storage of furs; in one, the furs are thoroughly cleaned and placed in a refrigerated vault; in the other, they are first put into a gas chamber where they are fumigated, and then placed in vaults which are periodically treated with the same fumigating gas. There is considerable difference of opinion as to the merits or advantages of this gas system over those of the refrigerated system.

MAINTENANCE AND UPKEEP

In the large store building, with all its vast amount of equipment, there comes the problem of maintenance and upkeep. Very often the tendency in the design of the building is to minimize the importance of allowing sufficient space for the accessibility to pipes, shafts, and so forth, which results in extremely difficult and costly maintenance. Too much stress cannot be put upon the importance of having large pipe shafts, with the piping so arranged as to be readily accessible. Nor must the accessibility of machinery or equipment be overlooked. Considering the cost of replacing the machinery which cannot be properly maintained due to crowded conditions, it is necessary to consider not only the bare cost but also the inconvenience due to a shut down.

Quality of Materials. In the selection of materials to be used in a store building, it is essential that care be exercised, for it is not merely first cost or replacement cost, but how seriously the replacement will interfere with the operation of the store, that matters. Nothing that is done must interfere with the selling organization. For example, failure of the elevators or the plumbing system during an anniversary week sale would be a catastrophe. Often the engineer is criticized because he wants to use brass water pipes or even return heating pipes. Nevertheless, he has probably been through the mill and is undoubtedly profiting by experience, in spite of the fact that the architect would perhaps rather spend the money involved for more marble in the vestibule or for more extensive decoration.

Considering the fact that the store building is a capital investment to be carried for a term of years, the character of materials should be such that it will require the least maintenance and replacement cost. In the layout and selection of equipment, it is always wise to consider how



STARRETT & VAN VLECK ARCHITECTS, N.Y. CITY

SUMMARY OF MECHANICAL EQUIPEMENT FOR MACY'S - ATLANTA STORE. CUBAGE - 7,186,000 (WITHOUT BOILER PLANT) FLOOR AREA - 46,800

•PLUMBING•

EQUIPMENT	FUNCTION	TYPE	SIZE	NUMBER	MOTOR H.P.
TANKS	SPRINKLER	PRESSURE	9000 GAL.	6	
	HOUSE	GRAVITY	36000 GAL 2500 F. RESERVE	1	
	BLOW-OFF	CYLINDRICAL	5' DIA. x 12'	1	
	SURGE TANK	CYLINDRICAL	7.5' DIA. x 15'	1	
	BOILER FEED	OPEN	"SEE BOILER PLANT"	1	
	D.W. BALANCING	"SEE TANKS REFRIGERATION"	4' DIA. x 6'	1	
	AIR TANKS	GENERAL	100# PRESS.	1	
		EJECTOR	50#	1	
		GEN. CLEANING	90#	1	
		ELEVATOR DOORS	35#	1	
		THERMOSTATIC CONTROL	15#	1	
		SPRINKLER	75#	1	
PUMPS	HOUSE	CENTRIFUGAL	125 GAL/MIN 200 FT. HD.	2	15
	CONDENSER WATER	"	"	1	15
	D.W. CIRCULATING	"SEE REFRIG."	25 GAL/MIN. 20#	1	15
	SUMP	VERT. CENT	2", 75 GAL./MIN	3	7.5
	FIRE	CENTRIFUGAL	1000 GAL./MIN.	1	150
	SPRINKLER	"	1000 GAL/MIN	1	150
	VACUUM	(SEE HEATING)		3	7.5
	BOILER FEED	(SEE BOILER PLANT)		3	15
HEATERS	HOT WATER	EXHAUST ST'M	1000 GAL/HR 50° TO 180°	2	
AIR COMPRESSORS		SINGLE STAGE	120 C.F./MIN. 100#	2	30
		" "	32 C.F./MIN 100#	2	7.5
EJECTORS		DUPLEX	50 GAL/MIN. 200 TOTAL	2	
HOSE	1½ STEEL REINFORCED SUCTION HOSE		25 FT LONG	36 LENGTHS	
VAC. CLEAN. SYS.	COMPLETE SYS ENTIRE BL'D'G., TO OPERATE 12 SWEEPERS SIMULTANEOUSLY. 30 HP				
SOAP SYSTEM	UNITS IN ALL TOILETS				

FIXTURES	BASE'MT.	1ST FL	MEZZ	2ND FL	3RD FL	4TH FL	5TH FL	6TH FL	ROOF	TOTAL
WATER CLOSETS	47	0	7	10	9	25	7	0	10	115
URINALS	12	0	2	3	0	3	4	0	5	29
LAVATORIES	39	0	8	9	9	24	7	0	6	102
DENTAL "	0	0	0	0	0	0	0	0	1	1
SURGEONS "	0	0	0	0	0	0	0	0	1	1
DRINKING FOUNT'S	2	2	4	2	2	4	6	2	5	29
SHOWERS	1	0	0	0	0	0	0	0	1	2
SINKS	0	0	1	0	6	2	0	0	0	9
BATH - FOOT	0	0	0	0	0	0	0	0	1	1
BATH - SITZ	0	0	0	0	0	0	0	0	1	1
SLOP SINKS	3	1	1	2	1	3	2	1	1	15
TOTALS	104	3	23	26	27	61	26	3	32	305

BathTub

REFRIGERATION

EQUIPMENT		SIZE	NUMBER	MOTOR H.P.
AMMONIA COMPRESSORS		SINGLE ACTING 4 CYL 9x9	3	150
		2 CYL 9x9	1	75
CONDENSERS		1¼ x 2", 19' LONG 12 PIPE HIGH	3	
LIQUID RECEIVERS		30" DIA x 16-0	2	
PUMPS	BRINE - AIR COOLING	1100 GAL/M 20# HEAD	4	20
	BRINE - KITCHEN CAFET. ETC	150 GAL/M 50#	2	20
	D.WATER - STORE	25 GAL/M 20#	1	15
	D.WATER - THEATRE		1	15
	D.WATER - SPARE		1	15
	CONDENSER WATER	800 GAL/M CENTRIFUGAL	3	20
DRINKING WATER COOLERS		100 GAL/HR 85° TO 40°	1	
		60 GAL/HR AT 35° FOR CAFETERIA	1	
AIR WASHER WATER COOLER	THEATRE	2½", 2100# EFFEC SHELL & TUBE TYPE	1	
	STORE	2½, 1200# " SHELL & TUBE TYPE	2	
BRINE COOLERS		2½; 3000# SHELL & TUBE TYPE	2	
BRINE SURGE TANK		15' x 6' x 4	1	
ICE FREEZING TANK & BRINE COOLER		FOR 40-50# CANS	1	
		BUHRING FILTER	6	
COOLING TOWER		95 x 13' ACTIVE DECK AREA	10 DECKS HIGH	

REFRIGERATORS		SIZE	NUMBER
ROOF CAFETERIA	GENERAL		1
	ICE CREAM BOX		1
6TH FLOOR KITCHEN	SALAD	5' x 10' x 7-6	1
	CHEF	5' x 6'-6" x 7-6	1
	GENERAL	8'-6" x 13-0 x 7-6	1
	DAIRY	6-6" x 8-6" x 7-6	1
	SERVICE & BAKERY	5-0 x 8'-0 x 7-6	1
	GARBAGE	5'-6 x 10'-0 x 7'-6	1
	STORRAGE	3'-6 x 21'-0" x 7-6"	1
	ICE CREAM	6'-4" x 2'-8 x 2'-0	1
		7'-6" x 2'-8" x 2'-10"	2
	MILK BOX	3'-8" x 2'-8" x 2'-10"	1
BASEMENT CAFETERIA	THREE COMPART'M'T	8'-0 x 4 0 x 7-6"	1
	ICE CREAM	5'-2" x 2-8 x 2'-10	1
	ICE STORAGE	11' x 12' x 7' 6	1

ACCUMULATOR & GAS DRYER	
MOTOR GEN SETS	(SEE ELECTRICAL)
AUTOMATIC ALARM SYSTEM	

FIRE PROTECTION

SPRINKLER SYSTEM	RISERS NUMBER	RISERS SIZE	DRY PIPE HEADS	WET PIPE	WET PIPE HEADS
	2	5"		BASE. LEVEL	732
	2	6"		1ST FL	75
	1	10" DEAD RISER		MEZZ.	555
	1	4" FILL LINE		2ND FL	558
				3RD FL	560
				4TH FL	562
				5TH FL	560
				6TH FL	600
				ROOF LEVEL	127
			92	TOTAL	4329
STANDPIPE	4	6"	32 HOSE OUTLETS		
TANKS, ETC	SEE HEADINGS UNDER PLUMBING				

KITCHEN EQUIPMENT

LOCATION		SIZE (NUMBER OF ITEMS)	MOTORS ½	¾	1 H	1½	2 H	3 H
BAS'M'T CAFETERIA		34 (INCLUDING REFRIGERATORS)	2	1				1
MAIN RES'RANT 6TH FL		58 ( )			4	3	1	
ROOF CAFETERIA		21 (")	1					1
SODA FOUNTAINS	BASE'M'T	5						
	1ST FL	AUTOMATIC CARBONATOR					1	
		CYLINDER, FILTER & FILTERED WATER TANK						

BELT CONVEYORS	APPROXIMATE LENGTHS									
	24" BELT	30" BELT	36" BELT	42" BELT		2	2	7	2	4
	36'	526'	450	164'						
	HANDLING ROOM: 58 x 100, BINS, TABLES, WALKWAYS, ETC.									

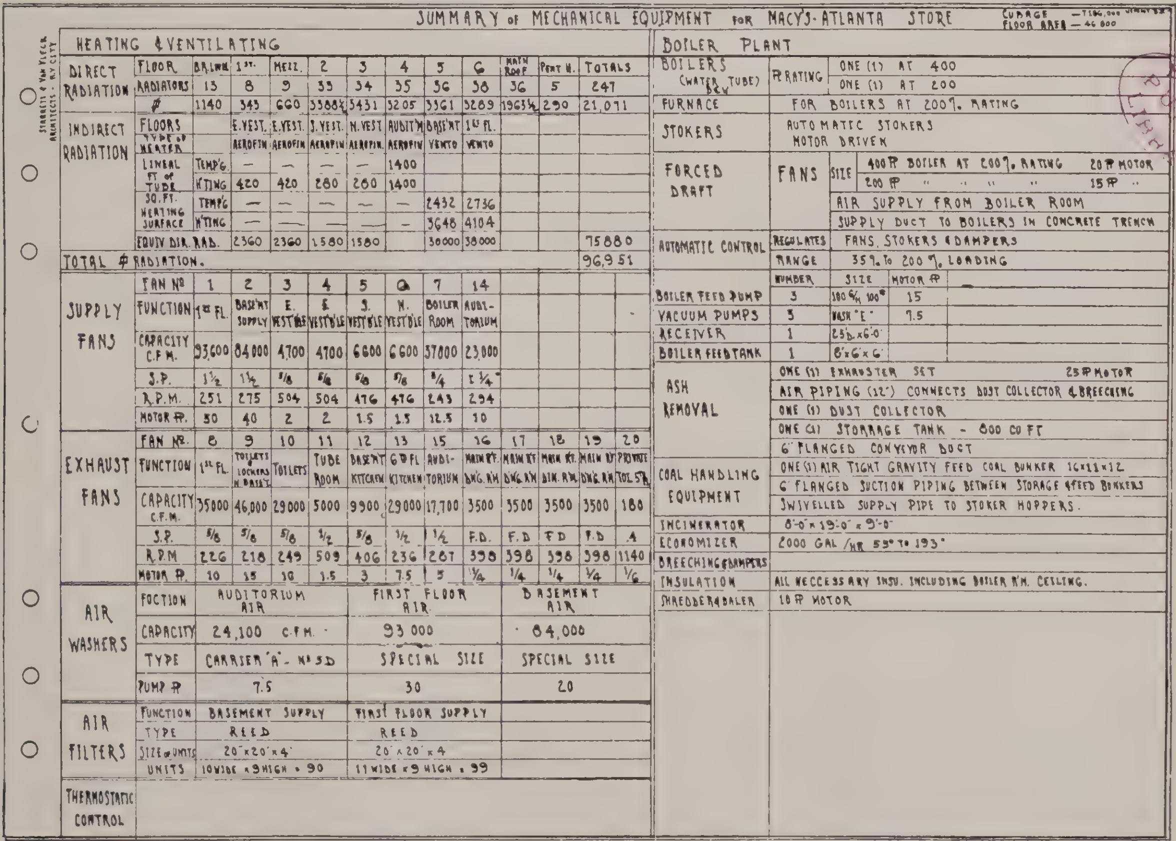
GRAVITY CHUTES	DESCRIPTION	TRIPLE BLADE SPIRAL	RUBBISH CHUTES
	NUMBER	2	2

PNEUMATIC TUBE SYSTEM	BLOWERS NUMBER	SIZE	MOTOR H.P.	R.P.M.
	2	3½# PRESS AT DISCHARGE ORIFICE	75	180

LAUNDRY	SPEC ALLOWS $20,000 FOR COMPLETE EQUIPEMENT

The Mechanical Equipment of the Davison-Paxon Co. Store, Atlanta, is Summarized on this Chart, in that Opposite, and the Chart on Page 932 simple it can be made, rather than how complicated. There seems to be a tendency to make equipment complicated, and by so doing give the impression that it must be good, whereas the more simple layout will probably cost considerably less and will certainly function as well. It will also relieve the operating department of the cost of keeping one more especially trained man to look out for it. The days of making engineering mistakes with impunity are gone forever. Equipment that is top-notch today may be obsolete tomorrow. There are no dark secrets, and practically all equipment can be seen or, if not, manufacturers are able to produce enough data to substantiate their claims for it. It is best to avoid, as far as possible, using something entirely new and original, particularly where it will affect the operation of the building. A store is no place for making experiments; only tried equipment must be used. This may seem to be contradicting a statement previously made, but it does not, for while some equipment may not have been applied to store work, it may have been developed for other uses, and it can be readily adapted. There is a tendency among some operating engineers not to put labor-saving equipment into a building, just as they at one time balked at buying public service current,—for fear of "losing their jobs." Thought must be given to this phase of the scheme of things, for anything to

Main Floor, Davison-Paxon Co. Building, Atlanta


SUMMARY of MECHANICAL EQUIPMENT for MACY'S-ATLANTA STORE

CUBAGE —7,186,000
FLOOR AREA — 46 800

STARRETT & VAN VLECK ARCHITECTS - N.Y. CITY

HEATING & VENTILATING

	FLOOR	BA.LWR	1ST.	MEZZ.	2	3	4	5	6	MAIN ROOF	PENT H.	TOTALS
DIRECT RADIATION	RADIATORS	13	8	9	33	34	35	36	38	36	5	247
	#	1140	343	660	3388½	3431	3205	3361	3289	1963½	290	21,071
INDIRECT RADIATION	FLOORS		E. VEST.	E. VEST.	S. VEST.	N. VEST	AUDIT'M	BASE'NT	1st FL.			
	TYPE of HEATER		AEROFIN	AEROFIN	AEROFIN	AEROFIN	AEROFIN	VENTO	VENTO			
	LINEAL FT of TUBE	TEMP'G.	—	—	—	—	1400					
		H'TING	420	420	280	260	1400					
	SQ. FT. HEATING SURFACE	TEMP'G	—	—	—	—	—	2432	2736			
		H'TING	—	—	—	—	—	3648	4104			
	EQUIV DIR. RAD.		2360	2360	1580	1580		30000	38000			75880
TOTAL # RADIATION.												96,951

	FAN No	1	2	3	4	5	6	7	14				
SUPPLY FANS	FUNCTION	1st FL.	BASE'NT SUPPLY	E. VEST'BLE	E. VEST'BLE	S. VEST'BLE	N. VEST'BLE	BOILER ROOM	AUDITORIUM				
	CAPACITY C.F.M.	93,600	84000	4,700	4700	6600	6600	37000	23,000				
	S.P.	1½	1½	5/8	5/8	5/8	5/8	3/4	1¼"				
	R.P.M.	251	275	504	504	476	476	243	294				
	MOTOR HP.	30	40	2	2	1.5	1.5	12.5	10				
	FAN No.	8	9	10	11	12	13	15	16	17	18	19	20
EXHAUST FANS	FUNCTION	1st FL.	TOILETS & LOCKERS N. BASE'T	TOILETS	TUBE ROOM	BASE'NT KITCHEN	6th FL KITCHEN	AUDITORIUM	MAIN RT. DNG. RM	MAIN RT. DNG. RM	MAIN RT. DIN. RM	MAIN RT. DNG. RM	PRIVATE TOL. 5th
	CAPACITY C.F.M.	35000	46,000	29000	5000	9900	29000	17,700	3500	3500	3500	3500	180
	S.P.	5/8	5/8	5/8	1/2	5/8	1/2	1/2	F.D.	F.D	F D	F.D	.4
	R.P.M	226	218	249	509	406	236	267	398	398	398	398	1140
	MOTOR HP.	10	15	10	1.5	3	7.5	5	1/4	1/4	1/4	1/4	1/6

AIR WASHERS	FUNCTION	AUDITORIUM AIR	FIRST FLOOR AIR	BASEMENT AIR
	CAPACITY	24,100 C.F.M.	93 000	84,000
	TYPE	CARRIER 'A' - No 5D	SPECIAL SIZE	SPECIAL SIZE
	PUMP HP	7.5	30	20
AIR FILTERS	FUNCTION	BASEMENT SUPPLY	FIRST FLOOR SUPPLY	
	TYPE	REED	REED	
	SIZE of UNITS	20"×20"×4"	20"×20"×4	
	UNITS	10 WIDE × 9 HIGH = 90	11 WIDE × 9 HIGH = 99	
THERMOSTATIC CONTROL				

BOILER PLANT

BOILERS (WATER TUBE) B&W	HP RATING	ONE (1) AT 400		
		ONE (1) AT 200		
FURNACE	FOR BOILERS AT 200% RATING			
STOKERS	AUTOMATIC STOKERS MOTOR DRIVEN			
FORCED DRAFT	FANS	SIZE	400 HP BOILER AT 200% RATING	20 HP MOTOR
			200 HP " " " "	15 HP "
		AIR SUPPLY FROM BOILER ROOM		
		SUPPLY DUCT TO BOILERS IN CONCRETE TRENCH		
AUTOMATIC CONTROL	REGULATES	FANS, STOKERS & DAMPERS		
	RANGE	35% TO 200% LOADING		
	NUMBER	SIZE	MOTOR HP	
BOILER FEED PUMP	3	100 G/M 100#	15	
VACUUM PUMPS	3	NASH "E"	7.5	
RECEIVER	1	25'D.×6'0"		
BOILER FEED TANK	1	6'×6'×6'		
ASH REMOVAL	ONE (1) EXHAUSTER SET			25 HP MOTOR
	AIR PIPING (12") CONNECTS DUST COLLECTOR & BREECHING			
	ONE (1) DUST COLLECTOR			
	ONE (1) STORRAGE TANK - 800 CU FT			
	6" FLANGED CONVEYOR DUCT			
COAL HANDLING EQUIPMENT	ONE (1) AIR TIGHT GRAVITY FEED COAL BUNKER 16×21×12			
	6" FLANGED SUCTION PIPING BETWEEN STORAGE & FEED BUNKERS			
	SWIVELLED SUPPLY PIPE TO STOKER HOPPERS.			
INCINERATOR	8'-0"×19'-0"×9'-0"			
ECONOMIZER	2000 GAL/HR 55° TO 193°			
BREECHING & DAMPERS				
INSULATION	ALL NECCESSARY INSU. INCLUDING BOILER R'M. CEILING.			
SHREDDER & BALER	10 HP MOTOR			

Continuation of the Summary Chart of the Mechanical Equipment of the Davison-Paxon Co. Department Store, Atlanta

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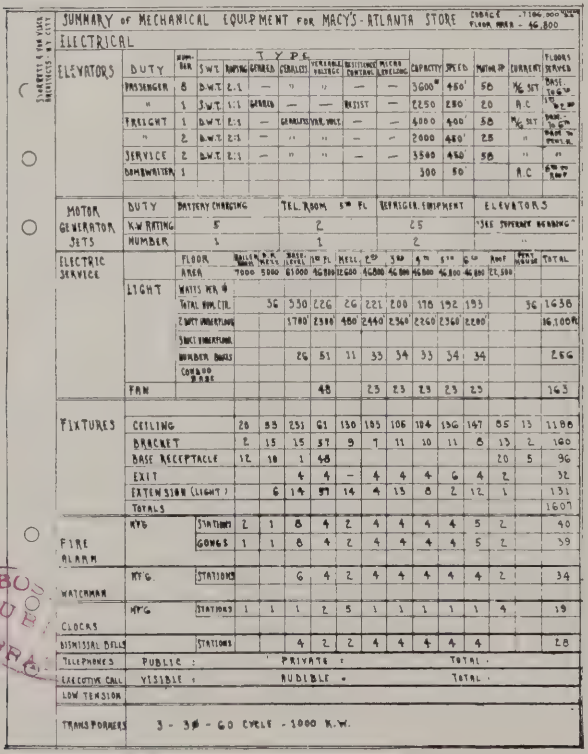
reduce labor cost must be considered. With the development of the central station, with its turbines producing electricity at the rate of 1 kw. for 1½ pounds of steam, there is little likelihood of any engineer's advising the installation of a private generating plant with all its complications, worries and accompanying disadvantages, to say nothing of the incidental costs and relative value of the space it would occupy if converted into selling area,—for after all, the merchant is selling,—not manufacturing.

Boiler Plant. By the same token, the question of using a boiler plant as against use of central heat, if such heat is available, should be carefully weighed, and where continuity of service is obtainable at suitable working pressures, it is of course to the advantage of the merchant to use the service of the central plant,—again saving space and avoiding the annoyance of handling coal and ashes. The question as to the type of boiler plant used depends on the size of the building and the uses of the steam. Generally, the average store building is of such size as to require boilers of the water-tube type. Though they are a little more expensive than some of the other types, they are more efficient, safer, more economical, and, with reasonable care, have a long life span. The type of fuel used, whether hard or soft coal, or oil, depends on the location of the building and the cost of the fuel. Of the three types of fuel, the oil is probably the cleanest if the burning equipment is properly selected and installed. With oil, the dust from handling the in-coming coal or the out-going ashes is entirely eliminated. The operating cost with oil may be about the same as with soft coal with high grade stoker equipment; for a rough comparison, oil at 4½ cents a gallon is equivalent, in cost, to coal at $5.50 a ton. The uninitiated should be careful about selecting oil-burning or stoker equipment, for there are many pitfalls.



STARRETT & VAN VLECK ARCHITECTS · N.Y. CITY

SUMMARY OF MECHANICAL EQUIPMENT FOR MACY'S - ATLANTA STORE

CUBAGE - 7,106,000 CU. FT.
FLOOR AREA - 46,800

ELECTRICAL

ELEVATORS

DUTY	NUMBER	TYPE S.W.T.	ROPING	GEARED	GEARLESS	VARIABLE VOLTAGE	RESISTANCE CONTROL	MICRO LEVELING	CAPACITY	SPEED	MOTOR HP	CURRENT	FLOORS SERVED
PASSENGER	8	D.W.T.	2:1	—	"	"	—	—	3600#	450'	58	M/G SET	BASE. TO 6TH
"	1	S.W.T.	1:1	GEARED	—	—	RESIST	—	2250	250'	20	A.C	1ST TO 2ND
FREIGHT	1	D.W.T.	2:1	—	GEARLESS	VAR. VOLT.	—	—	4000	400'	58	M/G SET	BASE. TO 6TH
"	2	D.W.T.	2:1	—	"	"	—	–	2000	450'	25	"	BASE TO PENT.H.
SERVICE	2	D.W.T.	2:1	—	"	"	—	—	3500	450'	58	"	"
DUMBWAITER	1								300	50'		A.C	6TH TO ROOF

MOTOR GENERATOR SETS

DUTY	BATTERY CHARGING	TEL. ROOM 5TH FL	REFRIGER. EQUIPMENT	ELEVATORS
K.W RATING	5	2	25	"SEE SEPARATE HEADING"
NUMBER	1	1	2	"

		FLOOR	BOILER ROOM	B.R. MEZZ	BASE. LEVEL	1ST FL	MEZZ.	2ND	3RD	4TH	5TH	6TH	ROOF	PENT HOUSE	TOTAL
ELECTRIC SERVICE		AREA	7000	5000	61000	46800	12600	46800	46800	46800	46,800	46,800	22,500		
	LIGHT	WATTS PER ☐													
		TOTAL NOM. CIR.		36	330	226	26	221	200	178	192	193		36	1638
		2 DUCT UNDERFLOOR			1700'	2300'	480'	2440'	2360'	2260'	2360'	2200'			16,100 FT
		3 DUCT UNDERFLOOR													
		NUMBER BOXES			26	51	11	33	34	33	34	34			256
		CONDUIT BASE													
	FAN					48		23	23	23	23	23			163
FIXTURES	CEILING		28	53	231	61	130	103	106	104	136	147	85	13	1188
	BRACKET		2	15	15	57	9	7	11	10	11	8	13	2	160
	BASE RECEPTACLE		12	10	1	48							20	5	96
	EXIT				4	4	–	4	4	4	6	4	2		32
	EXTENSION (LIGHT)			6	14	57	14	4	13	8	2	12	1		131
	TOTALS														1607
FIRE ALARM	MFG	STATIONS	2	1	8	4	2	4	4	4	4	5	2		40
		GONGS	1	1	8	4	2	4	4	4	4	5	2		39
WATCHMAN	MFG.	STATIONS			6	4	2	4	4	4	4	4	2		34
CLOCKS	MFG	STATIONS	1	1	1	2	5	1	1	1	1	1	4		19
DISMISSAL BELLS		STATIONS			4	2	2	4	4	4	4	4			28

TELEPHONES PUBLIC : PRIVATE : TOTAL .
EXECUTIVE CALL VISIBLE : AUDIBLE . TOTAL .
LOW TENSION
TRANSFORMERS 3 - 3φ - 60 CYCLE - 1000 K.W.

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Electrical and Other Equipment, Davison-Paxon Co.

LIGHTING AND ELECTRICAL WORK

There is no detail in connection with the modern store more important than lighting, which cannot be given too much careful consideration and study. The quality of the lighting has a tremendous bearing on the buying public; it has a certain amount of drawing power, just as a poorly lighted place is repulsive. People will shop in the store where the surroundings are most pleasant, cheerful and inviting. Good lighting does not necessarily involve use of the most extravagant fixtures, for lighting that properly displays the merchandise is not glaring or tiring to the customer, and it is one of the store's best salesmen. It is extremely important to so place the outlets as to distribute the light evenly without glare or excessive brilliance of the lighting units, for there is nothing that will cause more fatigue or injury to the eye, and, in fact, to the entire nervous system, than glare. Often we hear women complain of how tiring it is to shop in certain stores. This complaint can be traced to one of two things,—poor ventilation or lighting. If it is fatiguing to the customer, how must it affect the clerk, who is in the store day after day?

It is not necessary to have extremely high intensities of light to display merchandise, but it is just as harmful to have too little. There are advocates of high intensities of light. In fact, during the past ten years, the recommendations for proper lighting have jumped from about 4 candles per square foot to between 15 and 20. These latter figures are, in my personal opinion, usually excessive and unnecessary, for with the proper spacing of the outlets, and with well designed fixtures, an evenly distributed light can be produced,—a light which will flood the entire space. The effectiveness of general lighting depends, to a greater or lesser degree, on the reflecting properties of the walls, ceilings and floors, as well as on the colors of the fixtures and the general dimensions of the spaces to be lighted. It is well to avoid use of highly polished or glossy finished surfaces, such as the tops of counters, show cases, etc., for these surfaces only cause reflective or specular glare, which is very injurious to the eye. This can be avoided by using mat or stippled finishes, by shifting the light source, by reducing its brilliance, or by using an indirect lighting unit. Although there are many instances where artificial light of the color approaching daylight might be desirable, habit seems to demand artificial light of a warmer hue. The color of light plays an important part if the source is concealed, for the surrounding colors are made more effective. Where attempts have been made to produce a light resembling daylight in stores, there were so many surrounding influences, such as the color of carpets, furniture, merchandise, and wall and ceiling tints, that the results were negative. Although very extravagant in current consumption, it is believed most practical, where light approaching daylight is desired, for matching colors, etc., that the local specially designed counter unit be employed.

Lighting Fixtures. In the selection of lighting fitments it is wise to avoid the spectacular, for after all, the store is mainly for the sale of merchandise, and not for the exhibition of lighting fixtures. Perhaps the ideal light for a store building is the light from totally different indirect lighting units, which use the ceiling as a medium of reflection and give a diffused light which floods the entire area. For selling certain types of merchandise, such as linens, no better type of light can be used. The objections raised in regard to this type of fixture are usually based on its appearance and on the fact that it uses more current than the usual semi-indirect bowl. It is quite probable that during this year there will be on the market a fixture which will give all the benefits of the indirect, and at the same time be sufficiently luminous, by using horizontal or vertical louvers, to take away the objections to the indirect. The semi-indirect bowl is familiar to all, and this leaves little to say about it except that it should be large enough to properly diffuse the light and to properly distribute it. The lighting units should be suspended and should be outside of the ordinary range of vision. Special fixtures are often required for such departments as the glass and china departments, silver, jewelry, furniture, etc. Often there will be special display rooms where the lighting must be more of the theatrical type, with spotlights for special effect.

Show Window Lighting. The show window is the silent salesman and must be lighted in such a way as to be dignified and still contain enough of the theatrical to attract the widest possible attention. The exact quantity of light needed will depend very largely on the surrounding conditions, for both day and night use. Naturally, on streets which are brilliantly lighted, the windows, to be attractive, must be more brilliant. However, although a great deal of light is required, it should generally be evenly distributed and not spotty. Usually, reflector lights are provided both at the top and the bottom, near the glass, and these are supplemented by spotlight outlets at either side. All lights in show windows should be arranged so that color screens can be used. It is desirable, although not absolutely necessary, to provide diffusing glass in front of all the border lights. For the best effects it is desirable to keep the top lights well above the top of the window, so that the light source is concealed from public view. The control of the lights should be such that any degree or quality of light may be obtained, as well as any color effect. This is generally accomplished by the use of multiple circuits. Particular care should be exercised in the finish of the backs of show windows. They should not be highly polished, but should have a mat or diffusing surface, which is also more attractive.

In some few instances skylights have been provided over the entire window and the lighting placed behind the skylight, but it is questionable whether the results justify the additional expenditures. For special display it is desirable to obtain as much light as possible, and it is possible, for this purpose, to use efficiently a single flood or spotlight. There are many departments in a store building that will require special lighting,—such places as the workrooms, the delivery department, the tube room, the machinery room, the restaurant, kitchen, beauty parlor, etc., all need special treatment.

General Wiring. In arranging the wiring for general lighting, it is well to have control centers at convenient locations, accessible from the general selling areas, and so that the person operating can see the lights he wishes to turn on or off. The preferred location is adjacent to the stairways. Generally, each light should be individually controlled. In arranging general distribution or feeders it is well to separate the general lighting,—the night lights, case lights and emergency lights,—on separate feeders controlled from the main switchboard. It is very important that there be continuity of service of electric supply, for an interruption in the supply of electric current will not only encourage theft, but may result in serious panic. With the ever-increasing demands on electrical service in the department store, it is well to allow at least 25 per cent reserve throughout all the distributing system.

Besides the general lighting, there are case and display fixture lighting to consider. A great many of the more recent buildings, instead of trying to take care of this work from the ordinary lighting currents, have special rectangular wiring ducts run in the floor, to which the cases are attached. The use of these ducts makes it very practical to move and re-locate the cases without having to cut up the floor for new current connections. There are also numerous power requirements,—for in addition to the regular pumps, elevators, ventilating fans, etc., that are in every building, there are the workroom requirements. It is not uncommon, in a modern store, to have about 500 motors of various sizes, from ⅛ to 350 h.p.

Other Electrical Work. The executive call systems must be considered. These may be of the audible or gong type, or they may be of the silent type, where the executive's number is flashed when he is wanted. There is considerable debate as to which type is the more desirable. However, in some of the most recent buildings, the noise of the audible call was considered objectionable, and the visible type was installed. Then there is the usher's or aisle man's call from each of the several counters or departments. Unfortunately, up to the present time, no call that is entirely satisfactory has been devised. Some calls have numerous light outlets on columns; others use localized lights on the tops of display fixtures; others make use of annunciators; but all are open to some objection.

In addition to these systems, there are the fire alarm, sprinkler supervising alarm, the watchman's signal, clock systems, to say nothing of the network of telephone conduits, for there must be telephones in every department, both executive and selling, throughout the building. The fire alarm and watchman and sprinkler supervisory alarms are so closely governed by city and underwriters' requirements and regulations, that it seems best, except in unusual cases, to lease these systems from established, acceptable companies. With the almost universal adoption of alternating current for use of electrical energy, and with the advent of the telegraph clock, the solution of the clock problem, which has been more or less difficult due to the complications of its batteries, motor clocks, etc., is made easy.

Cash and Credit Handling. For the dispatch of credit and cash transactions, there are two general methods employed,—one using local cash registers and a telephone for authorization for charge accounts; and the other using pneumatic tubes. The telephone and register system is extensively used and is particularly adapted to stores where there is a preponderance of cash transactions. The system requires the installation of special telephones at the various departments and counters, and these terminate in a special control board in the credit department. The telephone has an auxiliary attachment which stamps the charge ticket, which is operated from the central desk, after the clerk has telephoned up for an O. K. The objection to this system is that it discloses to the public the customer's name and the object of the call, which sometimes causes considerable annoyance.

SPECIAL EQUIPMENT

Among the items which might be classed as special equipment would be those of beauty parlors; soda fountains; cafeterias; restaurants; kitchens; hospital rooms; laundries. The vogue of the beauty parlor has grown to such an extent that it not only requires special plumbing and electrical work, but special ventilation and air conditioning. In some of the modern beauty parlors, there are, in addition to the usual hair dressing, cutting, waving and manicuring compartments, special treatment rooms with their heat treatment, shower and rest rooms.

The soda fountain has developed from the "soda bar," where it was possible to get a soda or a plate of ice cream, to a miniature lunch room where all sorts of sandwiches, salads and pastry are served in addition to broth, soda, tea and coffee. This is generally located in a very prominent part of the store, either on the first floor or in the basement, and it requires very careful ventilation, for there is nothing that will permeate an area more quickly than the odor of coffee.

Besides providing the usual cafeteria for the employes, adjacent to the recreation center on one of the upper floors of the building, there are being installed cafeteria or buffet luncheonettes in basements, some of which serve as many as 3,000 persons during the luncheon period. This naturally requires special equipment and considerable service to handle such a volume of business. The store restaurant is a feature which has to be considered individually.

Every modern store is equipped with a physician's examination room, an emergency room, and rest rooms for both female and male employes. Some even expand this, and have rooms for eye specialists, chiropodists and dentists who take special care of employes. The equipment for these rooms is generally very simple, consisting of a bathroom, emergency toilet rooms and lavatories in each of the special rooms, together with the necessary electrical equipment for the examination and treatment of patients. Very often a small laundry is installed to handle the various uniforms and goods which have become soiled from handling. A laundry of this sort is quite simple; it requires only a few employes to operate it, and it is economical.

STORE FIXTURES AND INTERIOR EQUIPMENT

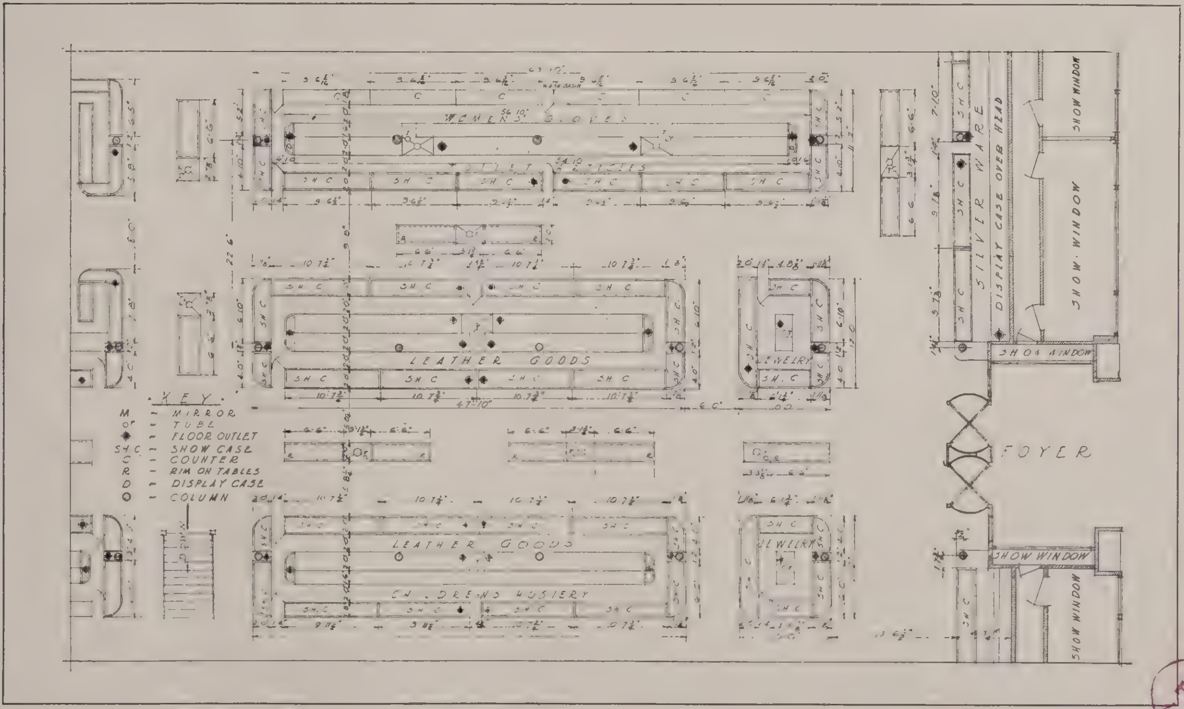
BY

GEORGE F. AND LOUIS A. AXT

THE requirements of the modern department store have become so varied and exacting that the design, arrangement and construction of the store fixtures and interior equipment are almost invariably handled by a specialist, called, quite correctly, the "fixture architect and designer." This branch of work requires a combination of artistic and technical training, a grasp of the architects' and engineers' problems, and an understanding of department store organization in regard to merchandising, delivery, and the handling of stock and personnel. The fixture problems vary, as the store may be a department store, a dry goods, specialty, or jewelry store, or a store selling furs, shoes, etc. In the larger stores with restaurants, luncheonettes, and beauty parlors, etc., the mechanical requirements demand the closest coöperation between the "fixture architect" and the architect of the building. This coöperation should, and usually does, begin in the preliminary stages of the planning of the store.

Planning. Since the entire department store building project is centered around one primary object,—that of selling merchandise,—the instruments of such selling are the determining factors in every phase of planning and construction. The entire floor space is designed to accommodate, in the most efficient manner, the counters, show cases, and other fixtures, and all the mechanical equipment is designed with the store fixtures in mind. Even the structural frame of the building is planned primarily in its relation to fixture arrangement, and the column spacing itself is determined by the sizes and arrangement of the store fixtures and the aisles between.

The usual procedure in planning an efficient department store is, first, to have the architect of the building work out with the client the general arrangement of the entrances, the probable locations of the elevators, stairways and escalators, and the probable depth of the show windows. The central selling area is for the time being left blank, without even an indication of locations of the columns. The fixture architect, in consultation with the client and the architect, then makes a layout of the fixtures to show the various counters, show cases, center fixtures, aisle tables and wall fixtures. When this fixture arrangement has been approved by the owner from a merchandising point of view,—and not until then,—are the structural columns spotted on the plans. Naturally, adjustments must be made, and the costs of various column spacings and framing must be considered before the columns are definitely located. The main aisles or the aisles opposite the entrances of the building



Fixture Plan, Meyer Brothers' Department Store, Paterson

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Side Aisle Showing Wall Fixtures and High Display Cases

Meyer Brothers' Department Store, Paterson

Center Display Case and Typical Aisle Display Case, Saks-Fifth Avenue, New York

Starrett & Van Vleck, Architects

BOS

are necessarily wider than others, and the columns must be spaced accordingly. The resulting spacing may be any distance from 18 or 19 feet up to 30 feet and more. Obviously, a fairly wide spacing is desirable on account of the large open floor areas. As the interior column spacing often varies, the exterior wall columns are usually spaced more or less independently to fit the exterior design.

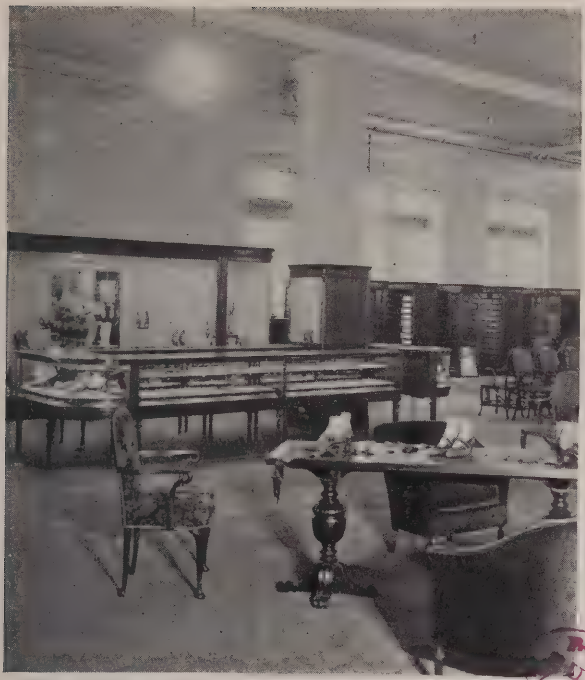
Wiring. Store fixtures require electric connections for display lighting, and it is advisable to install an electrical connection at the base of each column or a junction box in the under-floor wiring system to serve each "island." The wiring for the telephone service should be installed in conjunction with the work, serving all desired points. A tube system also requires the installation of a great many pipes, and these must be located by the fixture architect in order that they may be installed during construction.

Ventilation. In the ventilation of a modern store building, the air in the first floor and basement is usually exhausted through outlets in the floor connecting to the duct system, outlets which are distributed throughout the sales area. These must be arranged to come up in the fixtures, and they are usually provided with grilles in the faces of the counters or display cases.

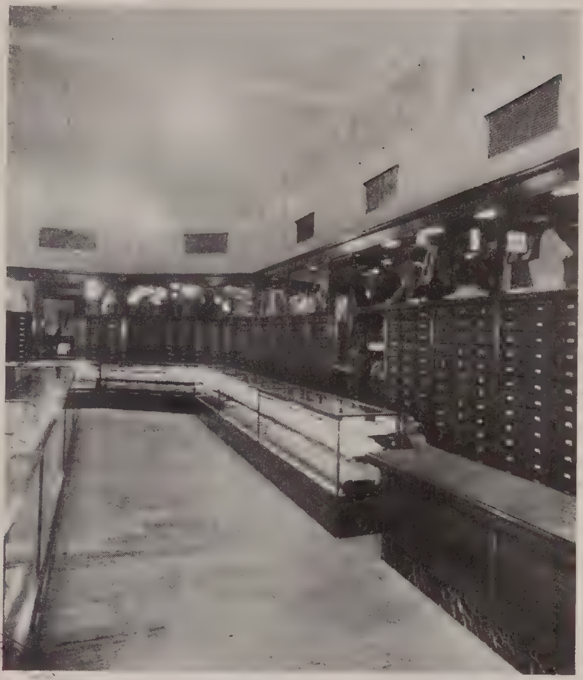
Belt Conveyors. The larger stores usually employ a system of moving "belt conveyors" at the basement ceiling to collect smaller packages from the first floor. Holes are provided in the floor to permit the packages to be dropped onto the belt, and this feature must also be taken care of in the general construction in relation to the store fixtures.

Finished Floors. Since past experience has shown that any floor plan is subject to change and alteration, it is an advisable economy to cover the entire floor surface with a finished floor which may be of marble, terrazzo, linoleum or rubber composition, or wood. By this practice an alteration may be quickly made, new aisle spacing created, and the finished floor is all ready to receive it. It is also desirable to have this floor as level as possible, since the pitch in the floor, if any, must be taken up in the base of the fixture, as the tops and shelves must always be level. A slight pitch in a fixture would cause sliding doors to roll out of position.

Unity of Design. With proper thought and coöperation between the architect and the fixture architect, the interior treatment of the building may be planned in a style which will show harmony of detail and character. Elevator doors, plaster ornament, ceiling panels, wood wainscot and fixtures can and should be so designed as to have something in common, which will create, in the eyes of the customer, an impression of coördinated beauty, and furnish an atmosphere in



Spaciousness Demanded by Modern Merchandising
Showing Special Display Cases



Wall Fixtures and High Display Cases,
Fresh Air Inlet Grilles Above

Saks-Fifth Avenue, New York
Starrett & Van Vleck, Architects

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which it is a pleasure for patrons to shop and buy.

Making of Plans. The type of store, the methods of merchandising, the funds available, and the plans for the future will determine the style, floor plan and details of construction and finish. When it is realized that the initial cost of the installation of fixtures may run to over $1,000,000 in a large store, and that the average fixture remains in place approximately 3½ years before it is shifted to another location (with the exception of the first floor fixtures, which are shifted more often), one can comprehend the necessity for making a painstaking analysis of the fixture plans and for having the most complete information available at the outset. After a competent fixture architect has been engaged, the first step is the making of preliminary plans. Every department store or chain of stores of any consequence has or should employ at all times in some official capacity a man who has not only a technical training but a department store training as well. This individual should act as the "liaison" officer between owners, architect and fixture architect.

There are no hard and fast rules for the layout of a department store; what holds good in one city or store may be just the reverse in another location, and there is an exception to every rule. The present and the contemplated future sizes and amounts of business of the various departments, and the ideas of the various buyers, department heads and floor managers, must all be collected and analyzed. For gathering this information the "liaison" man is necessarily valuable. Of course the fixture architect could lay out a new store in a strange city, relying only upon his knowledge and past experience, and there is no question but that in many respects it would be desirable and practical, but it is best to gather information of all the local conditions through all channels possible.

The General Arrangement of Departments. In a large store of five stories or more the arrangement might be:

First Floor. Jewelry, novelties, leather goods, handkerchiefs, neckwear, toilet articles, umbrellas, haberdashery.
Second Floor. Silks, wash goods, corsets, lingerie, blankets, boys' clothing.
Third Floor. Suits, cloaks, dresses, infants' wear, millinery.
Fourth Floor. Shoes, sport clothes, beauty parlor, evening gowns, furs.
Fifth Floor. Household furnishings, rugs, carpets, pianos, furniture.

In a taller building, the household furnishings, furniture, art and lamp departments, display rooms, etc., would probably be expanded proportionately on the upper floors. In recent years, the basement, which was once used for delivery or for the sale of hardware, crockery, etc., has become more valuable when used as a so-called "bargain basement." Many merchants have found this floor to be most convenient for the quick sale of lower priced articles covering the general range of cloaks, suits, shoes and wearing apparel. However, any plan decided upon must

Special Display Cases Are Often Necessary
Saks-Fifth Avenue, New York
Starrett & Van Vleck, Architects

be more or less flexible, as all departments are subject to enlargement or contraction, subject to seasonable selling, and a well planned layout will permit of such rearrangement without alterations of any consequence in the fixtures.

Fixtures and Arrangement. Certain manufacturers make fixtures of stock sizes and design which may be incorporated into a general scheme with probable savings in cost. The purchase and use of fixtures manufactured especially for a particular store not only permit the use of a design individual to the store, but may allow for a certain amount of flexibility in planning. The cost and desired effect usually determine the procedure in this regard.

The modern tendency, in the selling of wearing apparel particularly, is to carry a very small amount of exposed stock. This has diminished the number of hanging and clothing cases, the stock being kept in stock rooms directly on the floor, formed by a rectangular arrangement of display cases or partitions enclosing them. With styles changing rapidly, the store may carry a greater or less amount of stock without the fact being apparent to the public. This arrangement usually permits large open areas which are suitably arranged with tables, settees and chairs to enable the purchaser to relax and feel at ease while the individual garments are brought out for inspection. The rapid growth of small "specialty shops" adjacent to large stores has caused the large stores to construct within their buildings special "salons" or departments of individual design to meet this competition. These are designed to simulate the appearance of a small shop for the sale of a particular style of gown or hat, youths' clothing, important styles, etc. In most stores the constant change of styles, competition, and unusual increase or decrease of sales in certain departments require changes or alterations to the interior arrangements continually during the lifetime of the store.

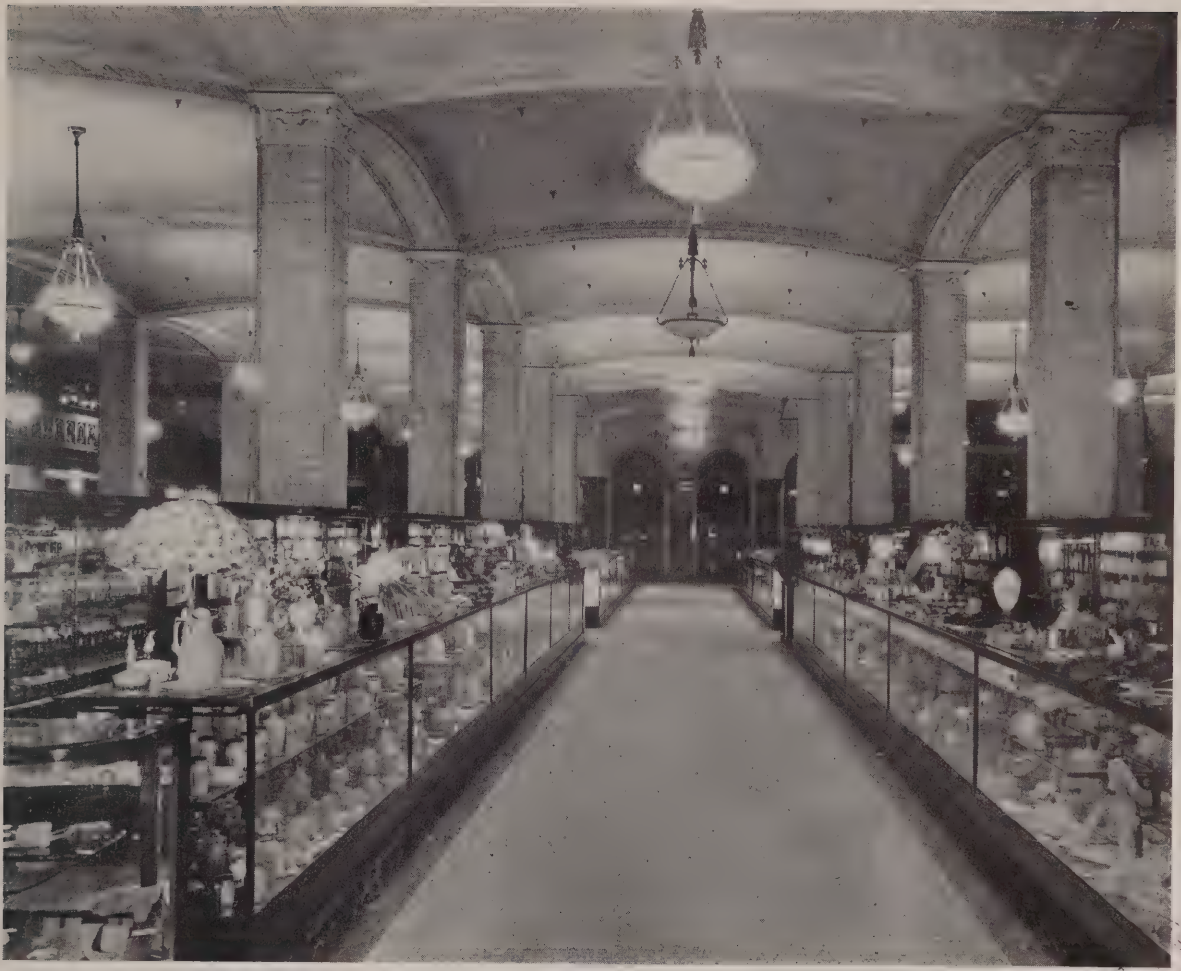
Aisle Spacing. A 14-foot to 18-foot width between counters for main aisles will provide not only ample room for pedestrian traffic but will also permit the placing of tables and bargain squares at rush seasons of the year. Aisles without tables, which are not main aisles, if made 8 feet wide will be found practical. If tables are placed in the aisles, a minimum width of 4 feet should be provided on each side of the table. Aisles on the upper floors will of course be much wider where the floor space itself is used for selling and display purposes. A minimum aisle width of 2 feet should be allowed at the rear of a fixture as working space for the employes.

Show Cases. The average show case is 40 inches high; 20 to 28 inches wide, and the length varies to suit conditions. The show case usually has a glass top, front and ends, sliding mirror doors in the rear, reflectors and glass shelves on adjustable metal brackets. The exposed bottom of the show case usually has veneered finish, with drawers below if the base is run to the floor.

Display Cases. These are quite similar to show cases in construction and finish. The height varies from 3 feet to 7 feet; width from 6 inches to 4 feet, and length to suit conditions. If small merchandise is to be displayed, glass shelves and mirror back will be used; if larger items are to be displayed and the shelves omitted, a veneer panel back will be more effective.

Counters. The width of counters varies from 1 foot, 3 inches to 4 feet; the average height is about 2 feet, 9 inches, and in most cases the counter top overhangs the body of the counter from 3 inches to 7 inches. All exposed surface should be of finished wood as selected, with a glass or linoleum top over the finished wood counter. The interior of the counter may have drawers or open bin spaces for holding stock as desired.

Tables are of two types; the first is similar to a library table with free-standing legs, and the second type has an entirely enclosed bottom, either with shelves protected by paneled veneer sliding doors or holding drawers. If the drawers are large, they should roll on patent extension drawer slides. The average table height is from



Low Center Fixtures Add a Sense of Spaciousness
Lord & Taylor Store, New York

Starrett & Van Vleck, Architects

30 inches to 33 inches, and a removable rim about 3 inches high is a valuable addition to provide for each table. The length and width vary in accordance with the amount of the space available.

Center Fixtures. These fixtures, behind counters, vary in height from 4 feet, 10 inches to 5 feet, 6 inches. If the height is kept down and a clear view allowed over the entire floor, a pleasing effect of spaciousness is secured. It is advisable that the tops of center fixtures be made of the finished wood. A minimum width of 4 feet from outside to outside will be found practicable with the drawer cabinets or display cabinets, being built in between the pilasters so that they are removable or inter-changeable except where special sizes may be necessary. If cash registers, wrapping desks or tube stations are to be built in as part of a center fixture, the necessary details for receiving pipes, power, etc., must be allowed for. Where stock is kept on shelves, the shelves should be removable, and if a panel back is built into the fixture, it can be quickly converted into a display cabinet. Glass sliding doors held in metal frames on the fronts of these fixtures not only allow the merchandise to be displayed but also keep the dust from reaching it. If a display case is used, the bottom of the case should be kept at least 2 feet from the floor, as the customer cannot see below that point when standing in the aisle.

Wall Fixtures. The average height of a wall fixture proper will vary from 6 feet, 6 inches to 7 feet, including the main cornice. On top of this are often erected display cases or stock storage spaces, the height of which may be from 2 feet to 6 feet, sometimes bringing the total height of wall fixtures to 12 feet. The depth of the wall fixture should be kept at 2 feet, on the average. It has been found that the highest point to which the average sales person can reach, without the aid of a stool or ladder, is 6 feet, and for this reason it is not advisable to erect either a drawer cabinet or shelf any higher than this. If a display case is erected above, it should have panel back, glass sliding doors, and should be illuminated with reflectors. Display cabinets or drawer cabinets in the fixture proper should be built in between the pilasters so as to be removable. Drawers may be either of uniform sizes or built especially to receive the different articles to be held. Bins also should be sized and constructed so as to hold the specified goods or articles designated. In the layout of wall fixtures, allowance must also be made for the entrances to show windows. Space should be provided which will make entrance and exit convenient.

Hanging Cases. With the exception of the children's and infants' departments, hanging cases will average 6 feet, 6 inches in height, with the hanger not more than 6 feet from the floor. The interior may be finished in the same manner as a display case with reflectors. The width should be 2 feet, 6 inches minimum, and the length varying to suit conditions. The front may have either swinging doors or sliding doors of glass in wood or metal frames (the sliding door is preferred). As explained previously, the tendency at this time is to use hanging cases mainly for display.

Fitting Rooms. These should be made as attractive as is possible. The size should be 6 feet, 6 inches by 6 feet, 6 inches. Full length mirrors set at the proper angle with reflectors should be installed so that the customer may have the most advantageous view of apparel being tried on. If natural wood finish is used, there is an opportunity to employ fine veneered wood panels. The average height of the walls is from 6 feet, 6 inches to 7 feet. Proper precautions must be taken to insure ample ventilation.

Special Salons. The special rooms or "salons" for the display and sale of millinery, furs, evening gowns, furniture, etc., afford an opportunity to create a setting of beauty and interest. The rooms may be done in the styles of the different periods or in the mode of the new "modern" which is now so popular. Beauty parlors, restaurants, etc., also permit of special designs not conforming directly to the store architecture.

Column Enclosures. These can be made more than just boxes around the columns by the choice of select veneer, and by special ornament and the installation of mirrors they can be made not only useful but attractive.

Cash Stands, Tube Stations and Wrapping Desks. The location of these stations is very important, and special consideration should be given this question, as the efficiency of completing a sale in the shortest elapsed time depends on the proximity of these units. To all of these, service spaces must be allotted for cash books, paper bags, twine, tube pipes, carriers, etc. The sizes vary according to the amount of business to be handled at any given point.

Lumber and Veneers. The term "best quality," when used for cabinet work, should mean nothing but the best. In the past, oak, birch, mahogany and walnut have been used extensively for store fixtures, but in recent years walnut has been used almost exclusively. Rosewood is perhaps the best for show case rails and edges of counters; it has a fine appearance and is a very hard wood, which permits the use of a small cross sectional area, as well as withstanding hard knocks and rough usage from handbags, umbrellas, etc. The "modern" treatment of special rooms has introduced numerous new veneers of beautiful design.

Glass, Hardware, Reflectors. Glass and mirrors have an important effect on the display and should be of the best quality. Hardware is also a very large item in cabinet work, and the selection should be made carefully and a complete schedule furnished. Hardware may be of statuary bronze, brush brass, nickel plate, or other material as desired. Proper illumination plays an important part in the display of merchandise, and tests have proved that by increasing and correcting the illumination on merchandise displayed, the percentages of sales consummated increased from 20 to 40 per cent. The finish of the exposed metal on the reflectors should match the hardware. Provisions for wiring and attaching the lighting equipment must be provided in the construction of the fixtures. The reflectors specified should be selected from the stocks of those firms which have specialized in this phase of lighting.

The marble base, if any, is generally ⅞-inch thick and of height specified, and is held in place by screws, which are countersunk with the heads neatly waxed over so as to be invisible.

Finishing of Wood. The firms with the best standing in the manufacture of store fixtures have gained their prestige in a large measure by the emphasis placed on workmanship in the finishing of their work. Good finishing requires good workmen, good material, and time. The natural wood which will be exposed should be well sandpapered, given one coat of stain, one coat of filler and three coats of shellac or varnish, as may be desired, each coat being well rubbed before the application of the next. The softer wood and unexposed wood should receive one coat of stain to match the general finish, and two coats of shellac.

Setting Up Fixtures. Fixtures should be fitted together in the factory during the course of construction so that they can be marked. When they are brought to the store, it will be necessary only to scribe them and bolt them together, thereby preventing any loss of time. The finish should also be completed at the factory, and no stain or finish should be permitted to be used at the building.

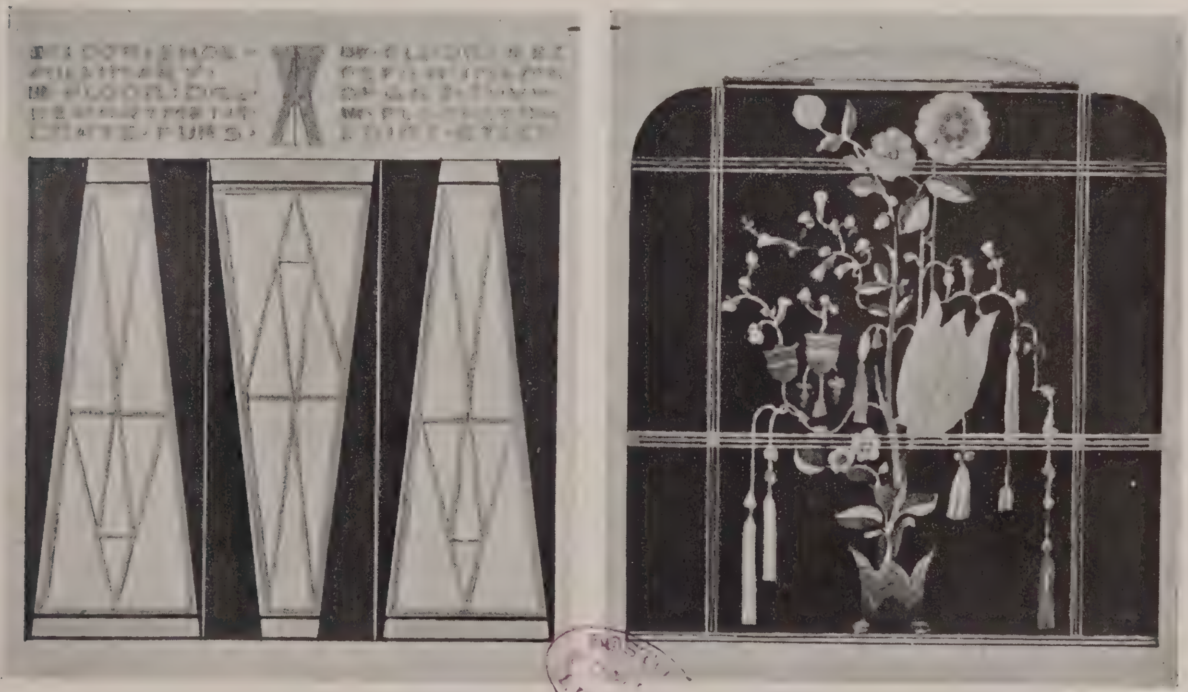
STORE ELEVATORS AND ESCALATORS

BY

THEODOR CARL MULLER

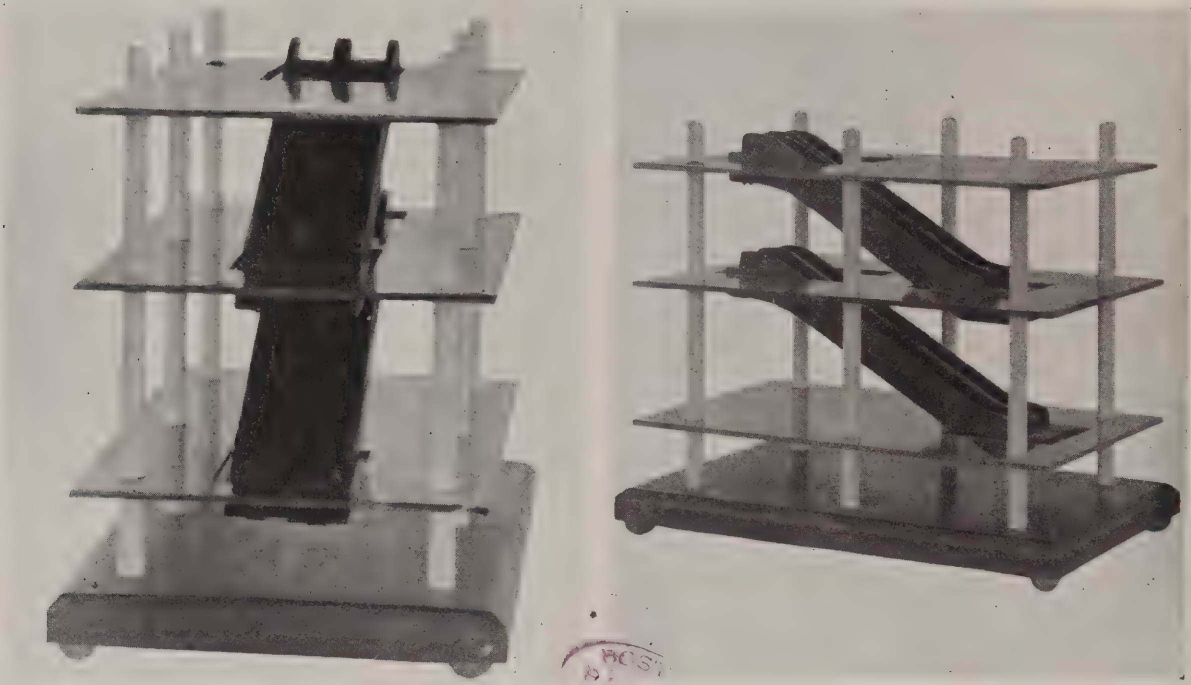
UPON the dictates of fashion and the modern science of merchandising rests the solution of the problem of department store traffic. If the architect lives up to the laws of both, he has succeeded, and in so doing he must achieve the *chic* and the economical by the same means. So long as the *chic* or tone of a large store depends upon a Spanish Renaissance interior or a building permeated with suggestions of the Roman Empire, his problem is to minimize the incongruity of elevators and escalators. In the domed and bemirrored interior of an elevator he may find a somewhat pleasant compromise, resembling the powder room in some palace of antiquity, but costume the thin steel span of an escalator in the manner of ancient stairways, he cannot. One turns hopefully to the fashion of the so-called modern movement, because it alone offers a flexibility which might incorporate under the same roof, smartness, scientific layout, and the design of elevators and escalators that will beautifully express their inherent qualities.

In the department store inadequate vertical transportation facilities so often exist undetected, even over a period of years, that the necessity of an expert solution of the individual problem is more urgent than in the office building, where faulty planning of the traffic results in recognizable symptoms. Whereas an office building tenanted to the extent of its capacity necessary to its financial success will give immediate indication of unsolved transportation problems in the complaints of tenants, it is not so with the customers of a store who, far from clamoring for their needs, will merely go elsewhere. The clientele quickly and quite imperceptibly proportions itself to the facilities of the store, and out of this distinguishing characteristic there arise the determinants of transportation and traffic service. The proportioning of these to the merchandising capacity of the store is imperative. Ostensibly there is greater danger of limiting that merchandising capacity than in incurring increased overhead due to ample provision for traffic. The expert will begin with the merchandising factors and arrive at a ratio of customers per hour to the transportation area or the square footage above the first floor minus dead space. In an active metropolitan department store this calculation may result in such a ratio as one customer per hour to every 25 square feet, or in some stores it may run as low as 1 to 60. This ratio is usually based on the peak load of an average busy day with due regard for Easter and Christmas rush



Drawings of the Elevator Doors and Elevator Interior, Bedell Store, New York

Designed by Joseph Urban, Architect



Model Showing Parallel Arrangement of Escalators in Center of Bay

periods, into which one third of the total annual sales may be concentrated. However, from this proportioning of sales activity to formula, the expert can arrive at a definite volume of traffic.

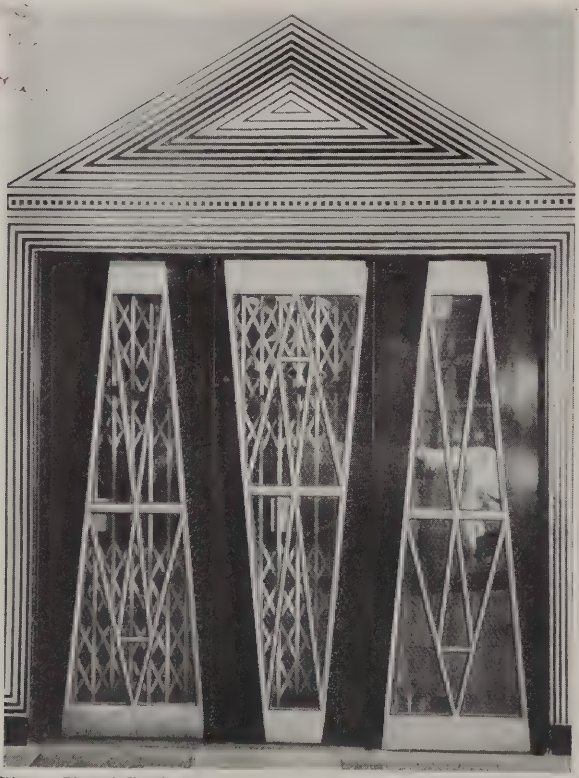
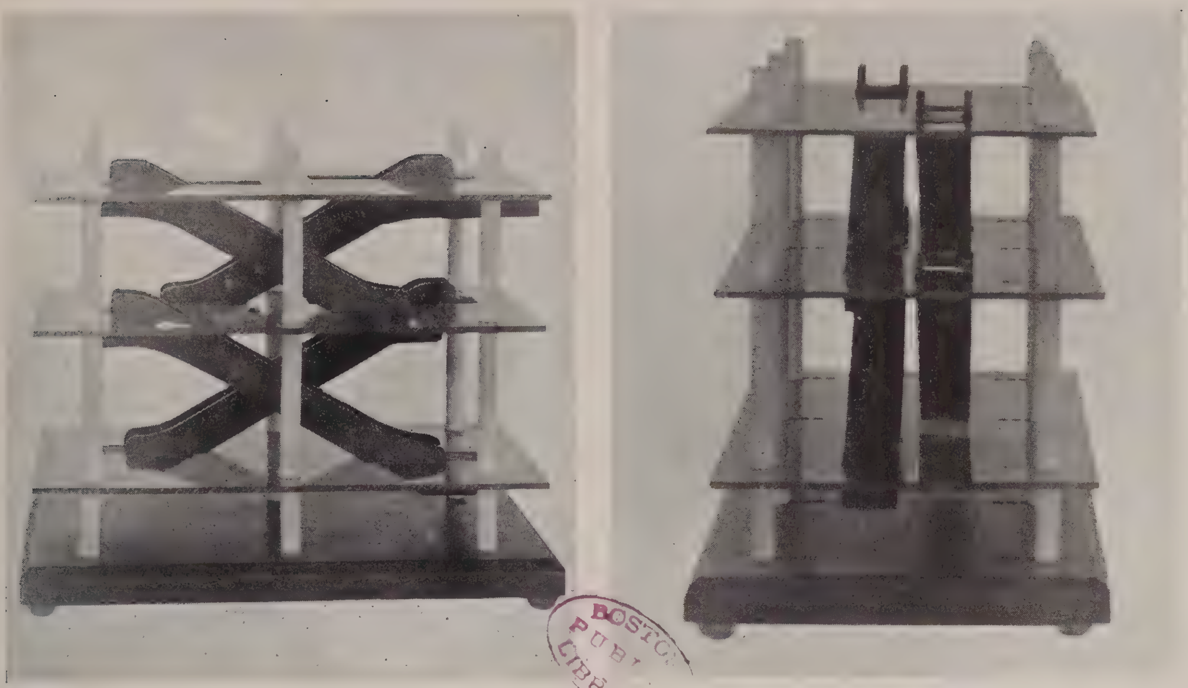


Photo. Sigurd Fischer

Elevator Doors, Bedell Store, New York

Designed by Joseph Urban, Architect

In contrast to the office building, where speed and height are criteria, the problem of the department store is quantity transportation, and that is why the escalator unit with a maximum capacity of 8000 passengers per hour figures prominently in the layout. The maximum capacity of the average elevator unit is 400 passengers per hour, —but one twentieth of that of an escalator. While the use of escalators would hardly be substituted for all elevators, their elimination of waiting and crowding places a large proportion of the traffic on them. Their further advantage to the store lies in their continuity of motion, low power cost, independence of operators, and their reversibility, which permits of doubling their efficiency in either direction, a feature useful during the opening of large sales and for the rapidly controlled emptying of the store at closing time. "Data collected from a large number of stores show that with both escalators and elevators there were double the number of customers on the upper floors in proportion to the entrance traffic as compared with adjacent stores of comparable sizes and having elevators only." However, one powerful argument for escalators is their sales promotion quality, carrying customers through departments of the store they might not frequent, and giving them a broad view of the display of goods on each floor. This involves the value of the power of suggestion in merchandising. Determining the escalators in R. H. Macy & Company's store, a total of forty units with a capacity

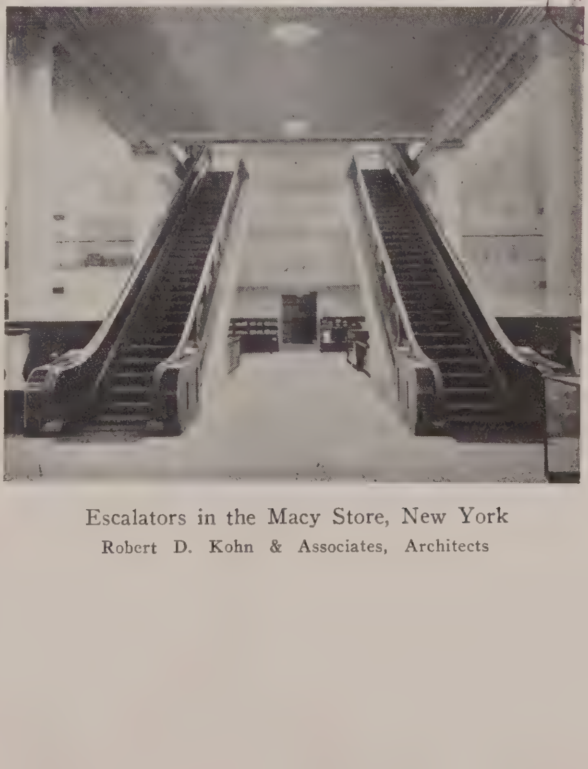


Model Showing Criss Cross Arrangement of Escalators in Center of Bay

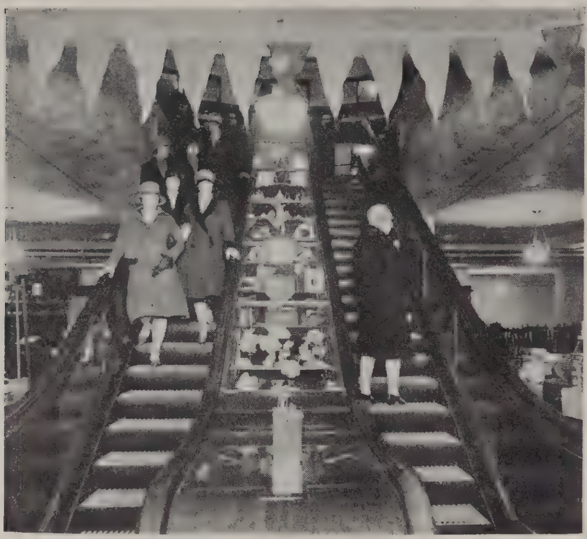
of 8000 passengers per hour each, a ratio of 1 to 19 was used, which is the more exceptional considering that a future increase of sales and transportation facilities is expected, lowering the factor of 19 square feet. In this instance the escalators carry 80 per cent of the total transportation. The largest escalator installation will be in the Kaufmann store in Pittsburgh,—a total of 66. This is a far cry from use of the first escalator, operated at the Paris Exposition of 1900.

Good planning generally leads to the placement of escalator units in the main artery of circulation, presenting them as a first choice to the public and offering their view of the entire floor. Elevators are divided into groups and distributed for convenience. Escalators are made in inside dimensions between balustrading of 2, 3 and 4 feet, carrying a maximum of 4,000, 6,000 and 8,000 passengers per hour respectively. They run on the standard angle of 30 degrees and at the standard rate of 90 feet per minute. There are two types. The "flat step type" up, down and reversible, is generally used in fixed direction escalators because reversibility demands a shunt at both top and bottom landings. The "cleat step type" up, down and reversible, has a comb at the landings and may always be reversed. Motors for each unit are placed underneath the floor at the top of the incline.

Three-dimensionally, the escalator may appear extremely large; that is a problem of design, but in actual floor space an escalator having a capacity of 4,000 persons per hour requires only 84 square feet at both upper and lower landings, making a total of 168 square feet on two separate floors. There are two usual arrangements. The parallel arrangement, as shown in the model, or with an aisle between, is generally used when it is required to take passengers from and deliver them into the same cross aisle space. Continuity from floor to floor is possible only where the aisle is provided between. The criss-cross or bucksaw as shown in the model is best used where continuity from floor to floor is desired. If an aisle is placed between, it is crossed by the continuing passengers, so that this arrangement is most effec-



Escalators in the Macy Store, New York
Robert D. Kohn & Associates, Architects



Escalators Separated by Show Case in Selfridge, Ltd., Store, London

tive where the escalators are planned to be adjacent.

In planning elevator groups very little arises in the special cases of stores in variance to the general elevator problem. Express cars would only exist in special cases where there are top floor restaurants, auditoriums or exclusive service to a specialty shop. The local cars designed for "quantity" and stopping at every floor should be as large as convenient entry and egress will permit, maximum dimensions being 6 feet in depth and 7 in width. The electric elevator has superseded the plunger and hydraulic elevators because of its economic superiority, but it need not be designed to exceed a velocity of 500 feet per minute. A satisfactory signal system is the "dial and light," whereby the passenger may determine at leisure for which car he (or more often *she*) will wait. The general practice of stopping at each floor whether signaled or not is advisable in department stores because it may suggest purchases to the passengers each time the door is opened, and it facilitates general circulation, though it may slow up the definite round trip. In design the elevator car and landing doors offer opportunities for luxury and comfort uncalled for in other buildings. The department store elevator is one of the few remaining in which a bench across the back of the car can be justified. Decoration and the placement of frames for posters is a matter of taste, but the use of mirrors in some form, whether covering the upper walls entirely for spaciousness or framed small for economy, is a matter of catering directly to the nature of the store's clientele. In high velocity elevator service mirrors have been advised against as a distraction and an indirect cause of landing door accidents. In the department store services the danger is less, but remains a factor to be weighed against their popularity.

In the Bedell Store, New York, the architect, Joseph Urban, has designed an extremely decorative car, the effect of which is only suggested in these illustrations, since the colors of the stylized flowers are brilliant against the black lacquered steel. Picture this car operated by a small Japanese girl in jade green pajamas, and you have an example of a *tour de force* peculiar to the problem. Obviously, glass is often favored in the landing doors, but their design should be such that no one need search for them. Certainly with them as with the car itself every detail should be as distinguished as the store itself, and the utmost be made of the chance afforded to impress customers favorably.

Designing escalators seems still to belong to the field of the engineer. The architects' opportunity is in creative design, for while a Renaissance design may conceal a splendid steel elevator cab, nothing can hide an escalator. The escalator will always jeopardize its antique balustrading! Fine materials used honestly will easily redeem it from its stark utility, if necessary. Lacquer colors or fine wood veneers may be applied to its housing. The treads of the steps may be painted, and moving hand rails provided in a variety of cast rubber tones. Whereas lightness of coloration recommends itself to effect spaciousness for confining walls of an elevator cab, for the escalator dark coloration affords a diminution in apparent dimensions,—or in both cases the use of mirrors or highly polished surfaces tends to camouflage with reflections the existence of overpowering forms or planes.

An unusual escalator treatment is that in the store of Selfridge, Ltd., London, where the up and down units of a parallel arrangement are separated by a show case flush with the rail and extending the full available length. At one time the use of advertising and display in the elevators of a large New York store was proposed, but it was rejected not only because distracted passengers might run by their stops but also because of the display limitations. There is some difference of opinion as to the wisdom of using an escalator showcase because of the advantage which lies in the view of counters where actual sales take place. However, the illustration shows that the showcase is hardly visible to the descending passengers who naturally take a better view of the ground floor than those ascending, who are more interested in the second floor.

KITCHEN EQUIPMENT FOR DEPARTMENT STORES

BY

WILLIAM DOESSERECK

THE planning of a kitchen and the arrangement of its equipment call for the consideration of several items: (1) Type of service; (2) Number of meals to be served; (3) Number of persons per meal; (4) Number of persons per seating; (5) Location of kitchen in relation to restaurant; (6) Method of provisioning kitchen; (7) Location of receiving room,—if located on upper floor, what elevator service is available; (8) Disposal of garbage,—what provision should be made for handling and storing of refuse. In addition, light and ventilation must be provided and, where at all practical and a choice of location will permit, the kitchen should be located so as to secure natural light and ventilation, which is preferable to artificial conditions. It should be noted that in some cities kitchens and bake shops cannot be placed in basements or areas without natural ventilation.

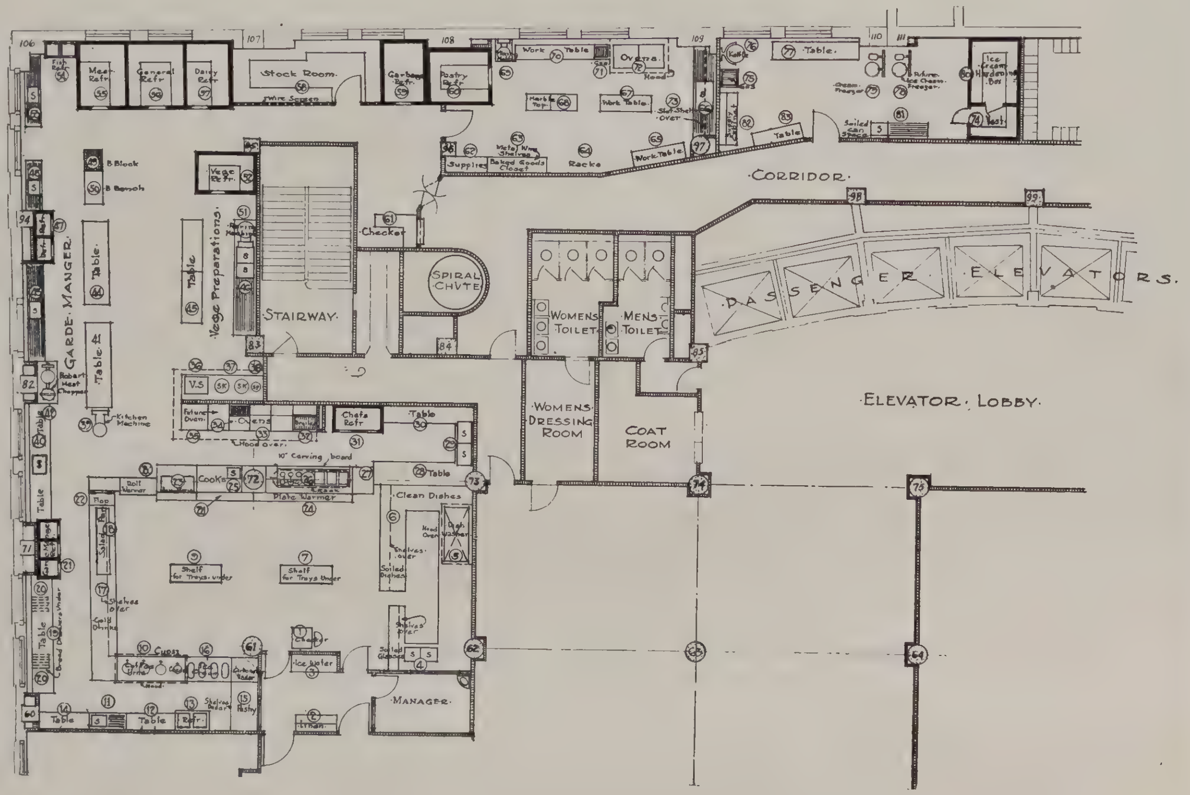
Efficient Planning. After the location has been decided upon, the general plan of the kitchen should be developed, keeping in mind the rotation of service and the necessity of having every part of the kitchen accessible in the order of culinary operations so that the service may be continuous with as few steps as possible by cooks, waiters and bus boys. A layout requiring cross travel or counter-rotation of service should be avoided. The layout should be planned to require the minimum amount of help, so that the number of employes may be changed as conditions demand without detriment to the service standards to be maintained. Efficiency and prompt service should never be sacrificed. The location of the kitchen with regard to the dining room should be such that the distance to be traveled between the kitchen and the farthest table in the dining room shall be as short as possible. With this arrangement the hot foods will not be cooled in serving. The arrangement of departments should be in the order of their importance and the type of kitchen, keeping together all work requiring heat, and grouping that requiring chilled or cool service, to permit better control of operation and ventilation. The exact location of the various departments depends entirely on the meals to be served. Cafeteria and "quick lunch" service will require that the kitchen be as close as possible to the service bars and allow direct access for replenishing the supplies.

Services. A separate room should be provided for dishwashing in order that the noise and heat may be isolated from the restaurant. Service pantries should be provided as cut-offs between kitchen and restaurant, thus minimizing noise and aiding in keeping out odors. Ample space should be provided for receiving and storing supplies, arranged to require the simplest system of storekeeping, and allowing for careful supervision of all supplies. There should be but one supply entrance from the outside and into the kitchen. The preparation spaces, bakery, pastry and ice cream shops should be kept as close to the service portion of the kitchen as practical, but still out of the way, bearing in mind that the whole arrangement should be compact and yet spacious enough for proper working, easy cleaning, minimizing the distance of travel for service to patrons. Adjacent to the dishwashing room should be a soiled linen room where the linen may be gathered up and bagged, ready for the laundry. A clean linen service room should be placed adjacent to the service pantries where the linen may be sorted and stored until required for use. Storage space should be provided for spare and surplus stock of dishes, table tops, etc.

Ventilation. The matter of ventilation is of great importance. It should be ample to change the air in the kitchen, pantries, etc., at least every three minutes. Special care should be taken to provide ample ventilation for the service counters or bars, giving particular attention to the hoods over coffee urns, as the odor of coffee will penetrate an entire building if the ventilation is not handled properly. The ventilation of the range and dishwashing rooms should be separated from that of the remainder of the kitchen. The range duct work should be provided with adequate fire dampers and bypass around the fan, and the duct work from the dishwashing room should be made watertight and self-draining.

Garbage Disposal. A refrigerator should be installed for the storage of garbage in cans pending its removal at pre-determined periods. The refrigerator box should be arranged to receive two cans for every 70 persons served. This will allow about 100 per cent of surplus in case of Sunday left-overs, etc. The disadvantage of handling garbage in this manner is the possible loss of silver and theft of merchandise, particularly in department store buildings where articles have been placed in the cans and covered with garbage in order to permit of their transportation out of the building. The importance of careful insulation of a refrigerator box or brine pipe line is a matter deserving special attention, since the value of insulation is only that of its weakest point.

Kitchen Fixtures and Details. The arrange-



SCHEDULE OF CONNECTIONS.

Nº	ITEM	GAS	HW	CW	WASTE	STEAM	RET	MOTOR	REMARKS
1	Checkers Desk	—	—	—	—	—	—	—	
2	Linen Cabinet	—	—	—	—	—	—	—	
3	Drinking Water	—	—	½ D.W	1½"	—	—	—	Brine
4	Sinks	—	¾"	¾"	2"	—	—	—	
5	Dishwasher	¾"	¾"	¾"	2"	¾"	—	½HP	
6	Sorting Table	—	—	—	—	—	—	—	
7	Set Up Table	—	—	—	—	—	—	—	
8	Roll Warmer	—	—	—	—	½"	½"	—	
9	Set Up Table	—	—	—	—	—	—	—	
10	Cup Warmer Urns	— —	— —	— ½" Ea.	—	½" ½" Ea.	½" ½" Ea.	— —	
11	Sink	—	¾"	¾"	2"	—	—	—	
12	Table	—	—	—	—	—	—	—	
13	Refr	—	—	—	1¼"	—	—	—	Brine
14	Table	—	—	—	—	—	—	—	
15	Pastry	—	—	—	—	—	—	—	
16	Soda Fountain	—	—	½ D.W	1¼"	—	—	[illegible]	Brine
17	Shelves	—	—	—	—	—	—	—	
18	Salad Pan	—	—	—	1¼"	—	—	—	Brine
19	Table	—	—	—	—	—	—	—	
20	Bread Drawers	—	—	—	—	—	—	—	
21	Garde Manger Ref	—	—	—	1¼"	—	—	—	Brine
22	Flap	—	—	—	—	—	—	—	
23	Bain Marie	—	½"	—	1¼"	½"	½"	—	
24	Plate Warmers	—	—	—	—	¾"	¾"	—	
25	Sink	—	¾"	¾"	2"	—	—	—	
26	Steam Table	—	½"	—	1¼"	¾"	¾"	—	
27	Rack for Pots	—	—	—	—	—	—	—	
28	Table	—	—	—	—	—	—	—	
29	Sinks	—	¾"	¾"	2"	—	—	—	
30	Table	—	—	—	—	—	—	—	
31	Chefs Refr	—	—	—	1¼"	—	—	—	Brine
32	Broiler	1¼"	—	—	—	—	—	—	
33	Ovens	1¼" Ea	—	—	—	—	—	—	
34	Salamander	¾"	—	—	—	—	—	—	
35	Future Oven	—	—	—	—	—	—	—	
36	Vege Steamer	—	—	—	—	¾"	¾"	—	
37	Steam Kettles	—	¾"	¾"	—	¾"	¾"	—	
38	Small Pot	—	—	—	—	½"	½"	—	
39	Kitchen Machine	—	—	—	—	—	—	1HP	
40	Table	—	—	—	—	—	—	—	
41	Table	—	—	—	—	—	—	—	
42	Meat Chopper	—	—	—	—	—	—	2HP	
43	Sink	—	¾"	¾"	2"	—	—	—	
44	Table	—	—	—	—	—	—	—	
45	Table	—	—	—	—	—	—	—	
46	Sinks	—	¾"	¾"	2"	—	—	—	
47	Refr	—	—	—	1¼"	—	—	—	Brine
48	Sink	—	¾"	¾"	2"	—	—	—	
49	Butchers Block	—	—	—	—	—	—	—	
50	" " Bench	—	—	—	—	—	—	—	
51	Paring Machine	—	—	¾"	2"	—	—	1HP	
52	Vegetable Refr	—	—	—	1¼"	—	—	—	Brine
53	Sink	—	¾"	¾"	2"	—	—	—	
54	Fish Refr	—	—	—	1¼"	—	—	—	Cracked Ice
55	Meat Refr	—	—	—	1¼"	—	—	—	Brine
56	General Refr	—	—	—	1¼"	—	—	—	Brine
57	Dairy Refr	—	—	—	1¼"	—	—	—	Brine
58	Stock Room	—	—	—	—	—	—	—	
59	Garbage Refr	—	—	—	1¼"	—	—	—	Brine
60	Pastry Refr	—	—	—	1¼"	—	—	—	Brine
61	Checkers Desk	—	—	—	—	—	—	—	
62	Supplies	—	—	—	—	—	—	—	
63	Baked Goods Clo	—	—	—	—	—	—	—	
64	Racks	—	—	—	—	—	—	—	
65	Work Table	—	—	—	—	—	—	—	
66	Sink	—	¾"	¾"	2"	—	—	—	
67	Work Table	—	—	—	—	—	—	—	
68	Table Marble Top	—	—	—	—	—	—	—	
69	Mixing Machine	—	—	—	—	—	—	1HP	
70	Work Tables	—	—	—	—	—	—	—	
71	Gas Stove	¾	—	—	—	—	—	—	
72	Ovens	1¼ Ea	—	—	—	—	—	—	
73	Slot Shelf	—	—	—	—	—	—	—	
74	Vest to Hardening Box	—	—	—	—	—	—	—	Brine
75	Gas Stove	¾	—	—	—	—	—	—	
76	Tilting Kettle	—	—	—	—	½"	½"	—	
77	Table	—	—	—	—	—	—	—	
78	Fut Ice Cream Fr	—	—	—	—	—	—	2HP	Brine
79	Ice Cream Freezer	—	—	—	—	—	—	2HP	Brine
80	Ice Cream Hard Box	—	—	—	1¼"	—	—	—	Brine
81	Sink	—	¾"	¾"	2"	—	—	—	
82	Supply Cabinet	—	—	—	—	—	—	—	
83	Table	—	—	—	—	—	—	—	

PLAN OF KITCHEN AND SCHEDULE OF CONNECTIONS; DAVISON-PAXON CO., ATLANTA.
STARRETT & VAN VLECK, ARCHITECTS; HENTZ, REID & ADLER, ASSOCIATED

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ment of the kitchen should be such that it may be readily cleaned and easy to maintain. The floor should be waterproof and the drainage piping arranged so as to be accessible. Piping run above the floors should clear it to avoid dirt pockets. Ample cleanouts should be provided, and provision should be made for flushing lines with steam and hot water. The drains for sinks and dishwashers should be taken through a grease trap, and the trap should be large enough to retain the grease. Monel metal is a desirable material for the use of finished pieces of equipment, except where cost makes it prohibitive, because of its wearing and cleaning qualities. The large kettles may be of aluminum or copper, preferably the former, since at a slight increase in first cost they are readily cleaned. They are also very durable and do not require re-tinning from time to time. The dishwasher should be of copper, as the hot water and washing powder tend to corrode the galvanized type, resulting in short life.

The refrigerators should be carefully designed, giving thought to accessibility and cleanliness. Very often the boxes may be grouped together and built of concrete with cork insulation. The hardware should be rugged and designed for hard service. No set rule has been made as to the exact number of fixtures required. There is a general tendency to over-fixture a kitchen.

In estimating the requirements for kitchen equipment, the size and capacity of principal items can be calculated about on this basis:

Range: One section, 2 feet, 6 inches for each 100 persons.

Steam Kettles: One 25- or 30-gallon kettle and one 25- or 30-gallon roaster will serve from 250 to 300 persons.
One 40- or 50-gallon kettle and one 40- or 50-gallon roaster will serve from 350 to 450 persons.
Two 30- or 40-gallon kettles and two 30- or 40-gallon roasters will serve from 500 to 750 persons.
Three 30- or 40-gallon kettles and three 30- or 40-gallon roasters will serve from 750 to 1,000 persons.

Coffee Urns: A 3-piece battery (2 coffee and 1 water) for 1,000 persons. Figure 15 cups of coffee to 1 gallon.

Water Coolers: Cooling capacity 1 pint per person.

Steam Tables: A 5-foot unit (2 meats, 4 pots, 2 gravies) will serve from 100 to 250 persons.
A 6-foot unit (2 meats, 4 pots, 2 gravies) will serve from 150 to 350 persons.
A 7-foot unit (3 meats, 6 pots, 2 gravies) will serve from 350 to 500 persons.
(Steam tables generally run the lengths of ranges and steam kettles.)

Ice Cream: A battery of three 20-quart cans will give 600 portions, using a No. 10 scoop.

It is better to provide separate water coolers for furnishing drinking water for the restaurant and cafeteria service of the department store than it is to use water from the general drinking water cooling system of the building. In this way a lower temperature can be obtained, and the amount of water to be circulated through the building is reduced, thus avoiding circulation losses. In many cases the use of ice in the glasses has been eliminated. Provision should be made in the refrigerating plant for cooling boxes, drinking water and a certain amount of cracked ice for kitchen service use. Generally a ton per day for 500 to 1,000 persons is sufficient.

Fuel and Steam. Gas is usually employed for the ranges and ovens in larger kitchens, and steam for the balance of the equipment,—except in remote places where the rates are low enough to warrant the use of electricity. Dishwashers, kitchen mixing machines, vegetable parers, etc., are driven by electricity, and such equipment as toasters and grills require electric connections. In some cases it is necessary to use electricity for cooking in department stores irrespective of cost, where there is no gas available.

The steam pressure for steam tables, etc., should be not less than 20 pounds or more than 50 pounds, and provided with adequate drips, control valves, etc. Practically all steam fixtures can be arranged for operation with gas with the exception of the double-jacketed kettle. The latest addition to the gas heater appliances is the vegetable steamer.

The average steam requirements for kitchens seating from 300 to 500 persons is 25 h.p., and the annual consumption of steam will be approximately 1,800,000 pounds. For a general restaurant, the current consumption per meal in a completely equipped kitchen will approximate 400 to 500 watts.

THE BUILDING SITUATION

A MONTHLY REVIEW OF COSTS AND CONDITIONS

NEW construction figures for April give every indication that the quiet in building activities prevailing during the first two months of this year was a strictly temporary condition, which has now been definitely overcome. In the money value of contracts awarded, the current April total for the 37 eastern states of $642,060,500 represents the second highest April total on record, according to the F. W. Dodge Corporation. It is 32 per cent above the total for March, just below the high record April of last year, and a monthly total higher than any reached during the record-breaking years of 1926 and 1927. Of the eight districts comprising the territory east of the Rockies, all but Texas showed an increase for April as compared with March, and five of the districts showed more construction than in April, 1928. In the district which consists of New York state and northern New Jersey, April construction amounted to $169,079,700, which was 52 per cent higher than for March and 12 per cent ahead of April, 1928. In the New England states, April work totaled $40,930,200. This represented a falling off of 10 per cent from the figures for April of last year, but was 28 per cent higher than that of the previous month. In the middle Atlantic states, April construction was 80 per cent higher than that of the previous month and 3 per cent above April, 1928. The total was $106,136,700. In the northwest the April total of $10,984,000 was just double the total for March of this year and was 54 per cent higher than for the preceding April. In the southeastern states also the April construction was higher than either that of the preceding month or the corresponding month of the preceding year. The April, 1929, total was $65,790,600. This was 52 per cent ahead of March and 19 per cent ahead of April, 1928. Neither the Pittsburgh district nor the central west came up to the April, 1928 totals, but both exceeded the March figures. In the Pittsburgh district the total of $61,013,200 was 15 per cent ahead of March, but 19 per cent under the preceding April. In the central west the April total was $169,239,100, which was 6 per cent higher than March but 10 per cent below April of the previous year. In Texas the April construction amounted to $18,887,000. This was the only state in which April construction fell below that of March, with a drop of 10 per cent. The total was, nevertheless, slightly higher than the April, 1928 total, according to the reports.

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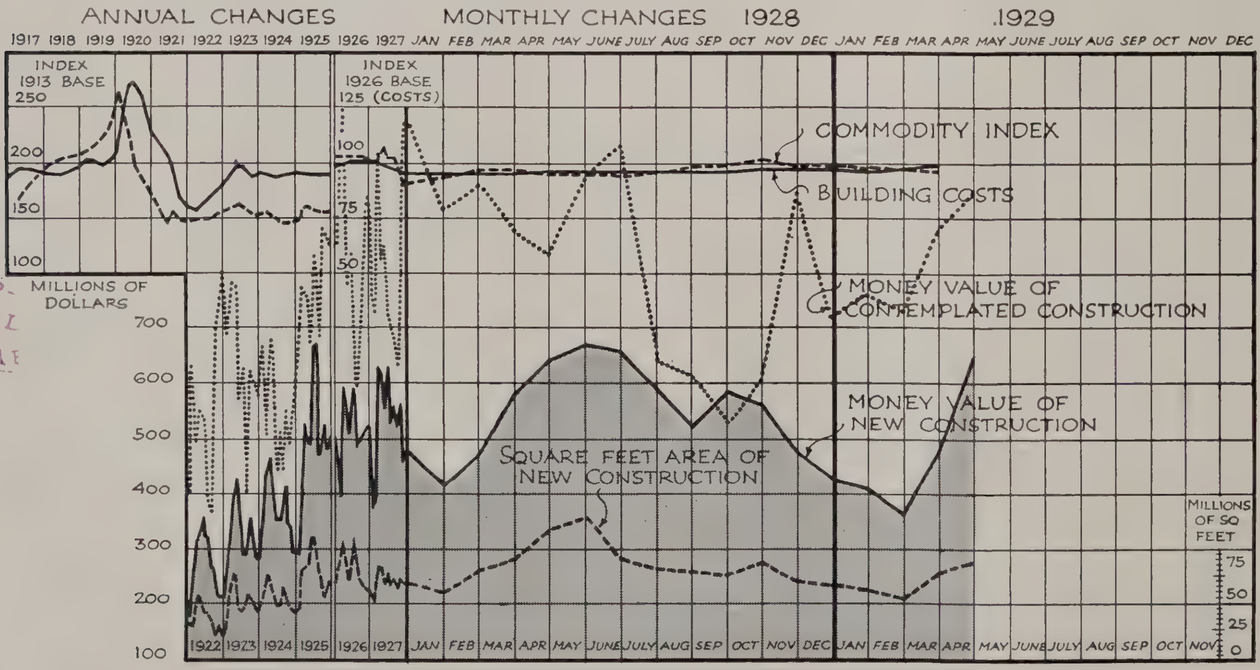


THESE various important factors of change in the building situation are recorded in the chart given here; (1) *Building Costs.* This includes the cost of labor and materials; the index point is a composite of all available reports in basic materials and labor costs under national averages. (2) *Commodity Index.* Index figure determined by the United States Department of Labor. (3) *Money Value of Contemplated Construction.* Values of building for which plans have been filed based on reports of the United States Chamber of Commerce, F. W. Dodge Corp., and *Engineering News-Record.* (4) *Money Value of New Construction.* Total valuation of all contracts actually let. The dollar scale is at left of the chart in millions. (5) *Square Foot Area of New Construction.* The measured volume of new buildings. The square foot measure is at the right of the chart. The variation of distances between the value and volume lines represents a square foot cost which is determined, first by the trend of building costs, and second, by the quality of construction.

HEATING AND VENTILATING THE DEPARTMENT STORE

BY

WILLIAM S. GAYLOR

THE science of merchandising, as it is developed in the modern department store, recognizes the necessity and value of providing physical comfort to both patrons and personnel. To this end the heating and ventilating systems are contributing a large share. Conditions in the store must be such that the patron will not be conscious of discomfort even in the most congested area, regardless of existing atmospheric conditions on the street. The conditions in the store must also keep the sales force comfortable so that the employes will be able to give full attention to duty.

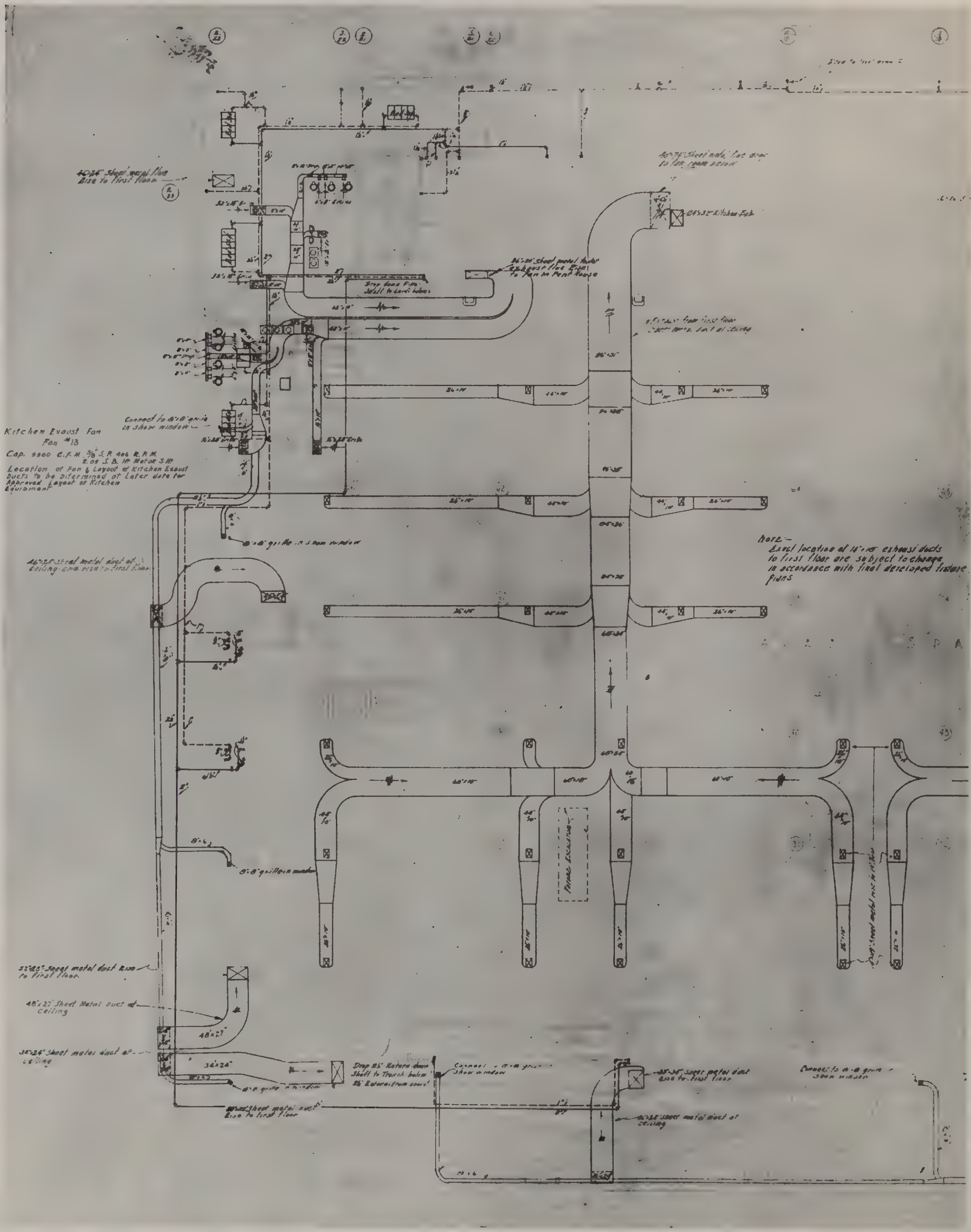
Areas above the first floor are generally heated by direct radiation. Due to the size of the building and the need of rapid circulation for quick heating up, the system best suited for the purpose is the two-pipe vacuum return system. The system should be designed to operate at a pressure of not over 5 pounds. Due to the necessity of keeping the basement ceiling free of large piping, the direct heating system should be of the down-feed type, with the distributing steam mains run on the ceiling of the top floor, exposed if the area is devoted to stockrooms, or in the furred ceiling if in sales space.

If the building is large, it is desirable to keep the size of the main steam riser at a minimum. This main riser carries steam at boiler pressure, with reducing valve at the level of the distributing main. The average store building requires the use of live steam at various pressures. The heating system, both direct and indirect, is usually operated at less than 5-pound pressure; hot water heating with steam at the same pressure; kitchen utensils require steam at from 35- to 40-pound pressure; pressing machines and other workroom appliances require steam at pressures of up to 60 pounds. To provide the necessary steam for these services alone, it is necessary to operate the boiler plant at a minimum pressure of from 60 to 75 pounds.

The space devoted to the boiler room should be kept at a minimum, due to the fact that in many cases this area must be excavated from rock, and also due to the value of space in this type of building. These factors require that the boiler be of such a type as can be operated at sufficient overload to produce the peak load with a minimum size of boiler. The water-tube boiler, with furnace volume for operation up to 200 per cent of rating, has been found to meet the condition required. A boiler of this type should have a height under the front header of not less than 12 feet. During the non-heating season the steam requirements are for hot water heating, for kitchen and workroom use. For this, it is necessary that at least one boiler be provided for summer use only. The steam requirement for the average department store per year amounts to approximately 3½ pounds of steam per cubic foot of space. The steam for hot water heating, kitchens and workrooms will generally amount to 10 per cent of the total annual heating requirements.

The selection of the proper fuel for the boilers is an important item for consideration. Fuel oil is particularly well adapted to this type of building. Good operating efficiencies can be obtained with this fuel. An evaporation factor of 13½ pounds can be obtained with the type boiler mentioned here. Fuel oil tanks are buried below the level of the boiler room; if the excavation is in rock, tanks are installed above this level. The use of a heavy oil of 14° to 16° is recommended in a plant of this type. An added value to the use of fuel oil in a store building is its cleanliness. The delivery of fuel oil is usually made at hours when street traffic is at a minimum, and without inconvenience to the store. There is also freedom from the dirt and labor of handling ashes. In large cities land value is such an important factor that floor area that can be devoted to selling must be figured at the maximum possible. Coal bunker space is naturally large and must be taken out of area that might be devoted to other uses. Even though the plant is to operate with fuel oil, it is necessary that some space be provided that can, in an emergency, be changed over to coal storage. It is also recommended that the boilers be so designed that coal-burning grates can be installed in a short time in case circumstances arise that curtail the supply of oil. The question of the kind of fuel to be used is also governed to a great extent by the geographical location of the plant in question. In certain locations in the middle west and north it is necessary that coal shall be the fuel. Each particular building presents an individual problem.

The direct heating system, as already said, is installed above the street floor level. Generally, the direct radiators are placed below the windows, hung on wall brackets, or, in the case of certain makes of windows, hung from hangers provided as part of the window aprons. Radiators should be hung not less than 8 inches above the floor to eliminate dust pockets. The higher class of construction provides for a pipe space behind the furring, so that all radiator branches from risers


Sheet metal flue Rise to first floor
Kitchen Exaust Fan
Fan #13
Cap. 5500 C.F.M. 3/8" S.P. 406 R.P.M.
Location of Fan & Layout of Kitchen Exaust Ducts to be determined at Later date for Approved Layout of Kitchen Equipment
Connect to 8"x8" grille in show window
8"x8" grille in show window
24"x32" Kitchen Exh.
Note —
Exact location of 14"x10" exhaust ducts to first floor are subject to change in accordance with final developed fixture plans
8"x8" grille in window
57"x25" Sheet metal duct Rise to first floor
48"x27" Sheet Metal Duct at Ceiling
48"x27"
34"x24" Sheet metal duct at ceiling
34"x24"
Drop 26" Return down Shaft to Trench below
Sheet metal duct Rise to first floor
Connect to 8"x8" grille Show window

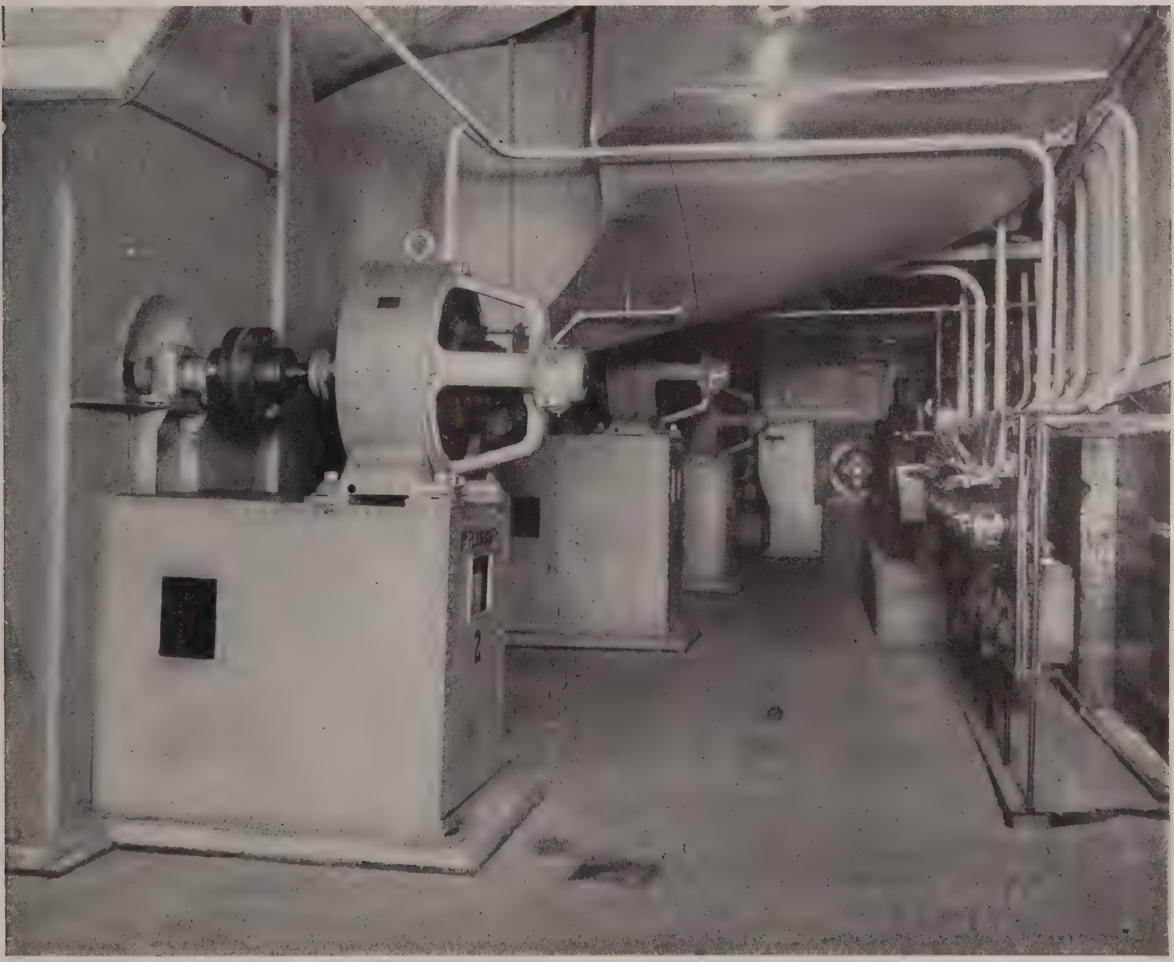
One-half Plan of the First Floor of the Davison, Paxon Co. Department Store, Atlanta, Showing the Heating and Ventilating Layout

Starrett & Van Vleck, Architects; Hentz, Reid & Adler, Associated

to radiators are concealed. In this class of construction the concealed radiator branches should be of brass pipe, due to the fact that horizontal piping is more likely to corrode than vertical piping. The new tube type of radiation is used generally from 20 to 26 inches in height, depending on the height of the window sill. The arrangement of direct radiators is dependent largely on the layout of the store fixtures. The fixture layout is generally different on each floor, and due consideration must be given to this in laying out the heating system. Usually the radiators placed under the windows will be in an alley between the outside walls and the backs of the fixtures. Care must be taken to see that the design of the fixtures is such that it will permit circulation of air over the radiators. The fixture layout is also a deciding factor in the control of the radiators. Thermostatic temperature control is strongly recommended from the standpoints of both economy and comfort. In open floor areas, the radiators are controlled in groups of three or four from one thermostat, generally located on columns along the wall. When radiators are behind the fixtures they are grouped in a similar manner, and the thermostats are, in turn, grouped under the control of a pilot thermostat located on a column in the open sales area, where the temperature is to be maintained. This is convenient.

Main Floor and Basement. The areas in the average store which require special attention are the main or street floor and the basement sales area. The main floor is usually entirely heated and ventilated by the forced blast system of circulated air, designed to operate successfully during both the winter and the summer. Direct radiation is used on the floor only in such places as service halls, stair landings, passageways, etc. Basement sales areas are entirely ventilated by means of a similar forced blast air system. There is little need of any direct heating surface in basements, generally, as the problem there is usually one of overcoming excessive heat even during the winter months. The air supply for the street floor is usually based on an air volume equal to six changes of the entire area per hour. The basement air supply is based on ten changes of air per hour, which will maintain comfortable conditions.

Air Supply. A properly located fresh air intake shaft from the roof to the fan room insures an air supply comparatively free of dust, but to further clean the incoming air, filters of the so-



A Portion of the Fan Room, Saks-Fifth Avenue, New York
Starrett & Van Vleck, Architects

called automatic type are installed in the intake to each fan unit. From the filters the air passes through tempering stacks with automatic temperature control, then through air washers, where the air, passing through a fine misty spray of water, heated to the required temperature, is washed and given the necessary moisture content to overcome a low relative humidity. Passing through the washer, the air is further heated by a re-heating stack to the temperature required to maintain the degree of comfort necessary in the area supplied. From the re-heating stacks, the supply fans discharge the air through a system of ducts distributing it evenly over the area.

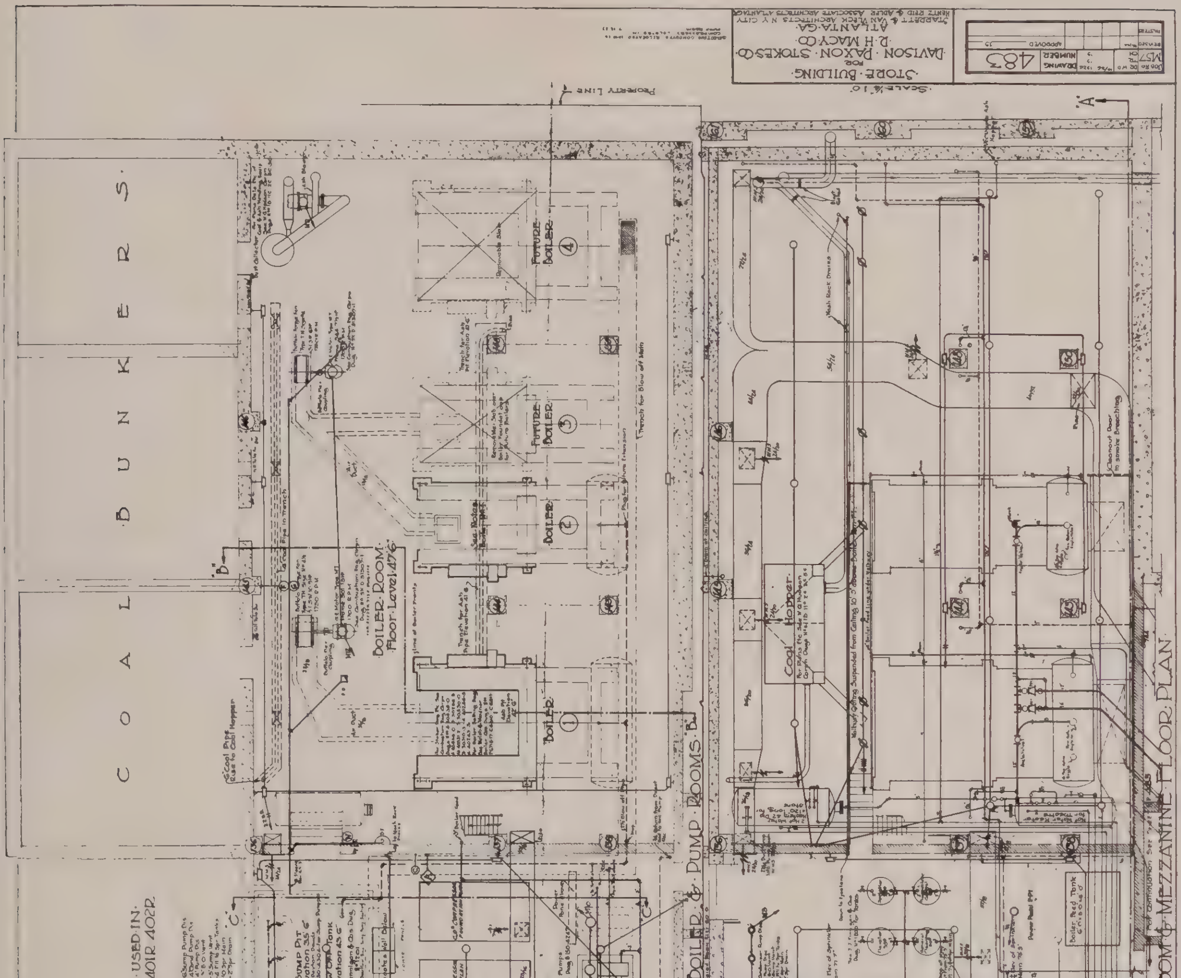
In street floor areas, the distributing ducts are usually run laterally in furred spaces above the show windows, discharging the air through grilles above the tops of fixtures back of the show windows. A variation of this method of distribution has the lateral duct run on top of the fixtures furred in to match, and grilles in panels. The present trend toward modernistic treatment, with recessed panels in the ceilings, permits the lateral ducts to be installed in the furred ceiling, discharge openings being continuous around the panels. In the basement area the most practical treatments of the supply ducts are to also run them in the furred ceiling, providing discharge outlets centered at the lighting fixtures. A sheet metal deflecting plate, hung approximately 8 inches below the ceiling, provides for the horizontal distribution of the incoming air, and it also provides a support for the lighting fixture. The introduction of air-conditioning systems for providing cooled air during the summer months necessitates use of this method of air supply to avoid the downward blasts of cold air.

The exhaust systems for both street floor and basement areas provide for drawing the air from the floor line generally through ducts built into the store fixtures at the columns. This exhaust air is carried through vertical shafts to exhaust fans in the roof and is then discharged to the atmosphere. This exhaust air is also by-passed and used to supply air to the boiler room, machinery rooms, and other areas where large volumes of circulating air are needed.

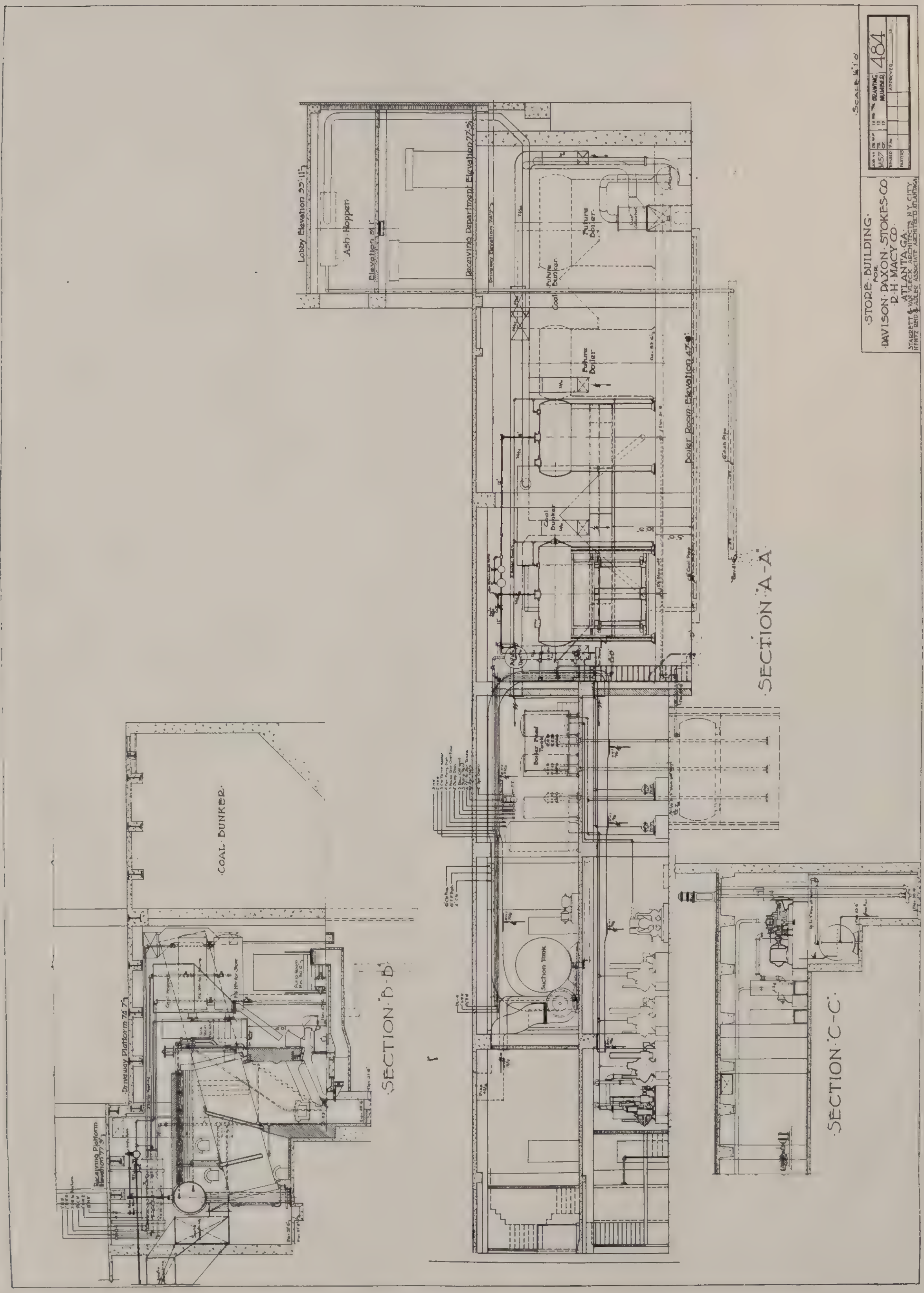
Air Conditioning in Summer. The supply and exhaust systems, as outlined, are primarily for use during the winter months. The same apparatus is used for conditioning the air during the summer. To accomplish this, only slight modifications are made in the systems outlined. To condition the air in the store during the most severe spell of high humidity and temperature, to the point where the temperature maintained in the sales area will be from 10° to 15° below that on the street, with a relative humidity of from 50 per cent to 55 per cent, is the most recent improvement in the ventilation of department stores. To condition the air, as outlined, the water sprayed through the air washer nozzles is cooled to the necessary temperature by means of a refrigerating plant. In the air-conditioning plant approximately 70 per cent of the exhaust air is returned to the supply fan units, there reconditioned and mixed with the makeup air of 30 per cent of the volume, and then returned to the sales area. The use of this large volume of re-circulated air is made necessary to keep the size of the refrigerating plant within practical bounds, and to keep the cost of the operation within the range of economy. In the use of a large volume of re-circulated air, it has been found to be advantageous to introduce ozone into the system at the point of discharge from the supply fans to overcome any possibility of odors being carried through and intensified.

Vestibules. The most vital points in the heating of the street floor area develop in the vestibules and the areas adjoining them in the store. The most practical and satisfactory method of treating these areas is to introduce large volumes of heated air into the vestibules through grilles under the show windows, or in the side walls. Each vestibule presents an individual problem, depending upon its size, arrangement, type of door, exposure, etc. Generally an air supply of from two to three times the volume of the vestibule per minute gives satisfactory results. This air is drawn from either the street floor or basement area, re-heated, and then blown into the vestibules. The temperature control for this air is regulated by thermostats adjacent to the entrance, inside, on the street floor.

Direct Radiation. Generally, throughout the store above the street floor, the building is heated with direct radiation. Each building presents its own problems. Areas devoted to beauty parlors, dining rooms, kitchens and special display rooms all present problems for individual treatment. Beauty parlors and dining rooms are areas that require air-conditioning systems similar to the street floor and basements. Kitchens, soda fountains and cafeterias require strong exhaust systems to avoid all possibility of odors penetrating into adjacent areas. The use of ozone in these areas is highly recommended as an agent for preventing objectionable odors. The air of the toilet rooms throughout the building is generally changed on an average of 20 times per hour. Exhaust ducts are usually run in pipe spaces back of compartments, with an individual exhaust grille at each compartment. All work spaces in the building are provided with exhaust ventilation. In areas such as general offices, where the occupants are likely to be congested, additional ventilation is sometimes required for their comfort.


STORE BUILDING
FOR
DAVISON · PAXON · STOKES CO.
R. H. MACY CO.
ATLANTA · GA.
STARRETT & VAN VLECK ARCHITECTS N Y CITY
HENTZ REID & ADLER ASSOCIATE ARCHITECTS ATLANTA
SCALE 1/8" = 1'0"
483
PROPERTY LINE
COAL BUNKERS
BOILER ROOM Floor Level 47'6"
BOILER 1
BOILER 2
FUTURE BOILER 3
FUTURE BOILER 4
Coal Hopper
PUMP ROOM Elevation 50'6"
SUMP PIT Elevation 35'6"
Air Compressors
Vacuum Pumps
5000 Gal. Suction Tank
Meter Room
Mechanical Store Room
TANK ROOM
Freight Elev.
Elevator Pit
GAUGE & STEAM METER BOARD
NOTE: THIS SHEET IS TO BE USED IN CONJUNCTION WITH SHEETS 401R 402R 435R 436R
PLAN BOILER & PUMP ROOMS "B"
UPPER PART OF BOILER ROOM & MEZZANINE FLOOR PLAN

PLAN OF BOILER AND PUMP ROOMS, DAVISON, PAXON CO. BUILDING, ATLANTA
STARRETT & VAN VLECK, ARCHITECTS; HENTZ, REID & ADLER, ASSOCIATED



SECTIONS THROUGH BOILER AND PUMP ROOMS, DAVISON, PAXON CO. BUILDING, ATLANTA

STARRETT & VAN VLECK, ARCHITECTS; HENTZ, REID & ADLER, ASSOCIATED

PLUMBING, SPRINKLER AND VACUUM CLEANING SYSTEMS

BY

HARRY H. BOND

PLUMBING and its associated equipment in the modern department store have grown, in recent years, to be important features, in a way similar to the advancement that has been made in the plumbing of the modern hospital. The plumbing installation is largely controlled by local plumbing codes, with which the engineer must comply. The plumbing pipes, which are of sufficient size, require special shafts, so that the engineer must also take into account the locations of these pipes in connection with the architectural features of the building. In its humble way, plumbing quietly provides "service" in the department store that is essential to the health and comfort of both the employes and the customers. Every architect realizes that it is necessary to have a sufficient number of toilet rooms scattered throughout the building to adequately serve the employes and customers, and he must consider the desirability of having outside windows in such rooms, the desirability of artificial ventilation, and the absolute necessity of providing mechanical ventilation in toilet rooms without windows. It is not desirable to install fixtures which may never be required, but it is even worse to have an insufficient number of fixtures. The number of occupants per fixture for men in department stores is often planned upon this basis:

Water Closets		Urinals	
Average	Maximum	Average	Maximum
100	200	250	300

Lavatories	
Average	Maximum
100	200

The number of occupants per fixture for women in department stores is:

Water Closets		Lavatories	
Average	Maximum	Average	Maximum
75	125	100	200

In arranging the plumbing fixtures in a toilet room, it has been found good practice to locate the water closets and urinals near the outside of the building, providing swinging doors with a 6-foot marble or metal partition separating the toilet compartments from the wash room which one enters from the store. Consideration should also be given to toilet room locations and their accessibility from all parts of the floor, so that they may be reached without walking a great distance. An economical arrangement would be to place the toilet rooms for each sex adjacent one to the other, so as to allow for the use of the same pipe and vent shafts. Care must be taken, however, to keep the doors as far apart as possible, and preferably out of sight of each other.

Toilet room arrangements are governed so largely by local conditions in the building that to suggest anything in the nature of a standard arrangement is almost impossible. Therefore, it is well to remember to put the fixtures requiring the most ventilation next to the outside windows; to keep the entrances to the toilet compartments protected from the view of passers-by; to keep the entrances for toilets accommodating opposite sexes out of sight of one another; and not to make the travel distances too great. If these suggestions are carried out, the main toilet room planning demands will have been met.

A slop-sink closet with a slop-sink is also an important feature to introduce closely adjacent, if not in the toilet rooms, and with either arrangement, the same plumbing risers may be used for both toilet rooms and slop-sink closets. Floor drains are generally installed in toilet rooms and have hose cocks placed at the end of the lavatory batteries in order to keep the water seals in the traps of the floor drains.

Wall-hung water closets, urinals, slop-sinks, lavatories and drinking fountains are the most desirable types of plumbing fixtures for the department store, since they permit ready access to all parts of the floor space in and around any toilet room. Flush valves are part of standard equipment for all urinals and water closets, with self-closing faucets for the lavatories. Metal faucets, flush valves and escutcheons are much more serviceable than china-handled faucets and china escutcheons. Soap-dispensing systems, fed from tanks with soap valves over each basin, are now an important detail in the modern department store toilet room. Mirrors with shelves beneath are an added convenience much appreciated by both customers and employes.

In many instances the basement and sub-basement floors of these stores have higher than the average building story heights. This, in turn, often leaves the level of the street sewers above the basement and sub-basement floors, and all plumbing fixtures on these floors have to discharge their sewage into ejector pots which, in turn, pump the sewage up to the street sewers. Sump pumps are also installed to take drips from pumps, tanks, boiler blow-offs, floor drains, etc., that are also below the level of the street sewers. This waste water is drained to a concrete sump pit generally located in the pump or machine room with vertical centrifugal pumps that will start pumping automatically when the water in the pit reaches a certain level, and stop when the pit has been emptied.

With constant use of water in this type of building, and the pressure required for perfect operation of the plumbing fixtures, and instant demand, the use of water directly from the street mains is no longer recommended. Therefore, storage of water in either closed suction tanks or open suction tanks is, together with house tanks in the penthouses, the proper way of serving the plumbing requirements for the store. In case of break downs in the street water mains, tanks designed to hold a water capacity to suffice for several hours will serve the store during such a crisis. In order to transfer the water from the suction tanks to the house tanks, usually a distance of several stories, it is necessary to provide pumps, generally in duplicate and of equal capacity, that will convey a sufficient quantity of water to the house tanks to meet the maximum demand per minute. From the house tanks water is supplied to all plumbing fixtures requiring cold water, to the hot water heaters in the pump or boiler rooms, to the drinking water system, and also to the standpipe system.

Vacuum cleaning systems in department stores afford the owner an arrangement whereby the building may be thoroughly cleaned within a few hours. A stationary vacuum cleaning installation consists of pipe risers with the number of outlets on each floor so arranged that 50-foot lengths of hose attached to the risers will reach any part of the floor, wall, show cases or fixtures. Tools are furnished with an installation of this character, so that the vacuum cleaner can be used for rugs, walls, radiators, etc. The vacuum machine is located in the pump room, and connecting with the machine is the separator into which all dirt, dust, pins, etc., are collected. The separator is easily emptied, and the contents are burned in the incinerator or otherwise disposed of.

The sprinkler system layout for the department store of today is important, particularly because the design must meet with the approval of the local fire prevention bureau, the National Fire Insurance Exchange, the local insurance exchanges, the owner, and last but not least, the approval of the architect. Interference with ventilating ducts, electric conduits, lighting fixtures and steel members must be avoided, and still the system, when installed, must be symmetrical and afford the owners 100 per cent sprinkler protection. Penalties in the form of higher insurance rates will be incurred if the system is not properly designed and installed.

Where the appropriation permits, the neatest ceiling for a department store will be obtained when the entire sprinkler installation with the risers, valves, mains, branches and laterals, is concealed. Such a ceiling will have only the sprinkler heads exposed, evenly spaced with column centers, panels and the lighting fixtures. In some buildings this ceiling scheme is carried throughout, though in others it is applied only in the selling areas, and the sprinkler system is run exposed in the utility spaces. Where the resources of the department store do not warrant installing a concealed sprinkler system, the mains, branches and laterals are all run exposed, and the sprinkler heads are, as usual, evenly spaced with column centers, panels, lighting fixtures, etc. Where the sprinkler system is concealed, a more decorative ceiling can be obtained, and if the sprinkler heads are objectionable, they can often be incorporated in the ceiling design, whether it be elaborate Tudor or simple "modern."

The water supply to the sprinkler system comes from either gravity tanks or pressure tanks, located on the roof or in penthouses. In some instances, a combination of gravity and pressure tanks is used. The gravity system of tanks must have twice as much water as a pressure tank system, as the latter is kept under a pressure of 85 pounds at all times. The amount of water used is based on the total number of sprinkler heads in the average area, times 20 gallons per minute for 20 minutes, times 25 per cent for gravity systems, and times 12½ per cent for the pressure systems. Siamese connections must also be provided on the sprinkler system at each street front.

Where sprinkler heads are so located that they may be subject to corrosion, they must be protected with a coating to make them non-corrosive, and where they are subjected to a higher than average temperature, they must be set to discharge at a higher temperature. Sprinkler heads in show windows must be run from what is known as a "dry" valve on a dry system which contains air under pressure in the lines. When the heads go off in a show window, due to a fire, they release the air in the piping system which, in turn, releases an equalizer in the dry valve, and the water then follows the air to the opened sprinkler heads. The actual time for this operation is in seconds, and it has proved its worth in the few show window fires which have occurred.

A MODERN STORE ALTERATION

BY

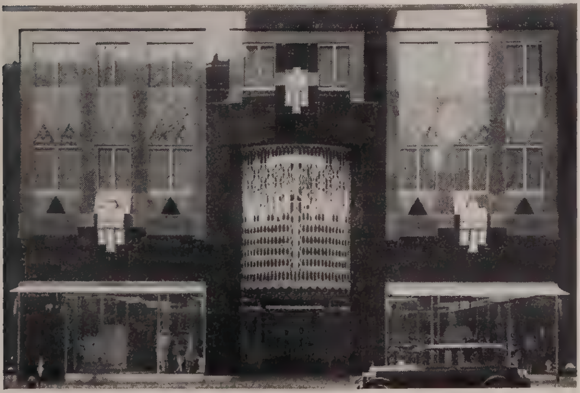
ARTHUR T. NORTH

THE fickle nature of fashion with its constant and rapid changes has caused a great expansion of the allied industries and commerce with attendant transformations in merchandising methods,—all of which is manifested in the evolution of the store and shop. In the days of drab fashions, the store and shop were equally as uninteresting. The housing was in harmony with the merchandise. The universal demand for the beautiful, the causes of which do not concern us at this time, has been expressed in beautiful merchandise of every kind which requires equally attractive surroundings for its display and sale. With suitable facilities for display there must be adequate provision for inspection and purchase, which necessitates ample space for the circulation of purchasers.

The primary requisite for merchandising is external display to the passer-by,—the potential purchaser. This is had through the medium of show windows. After the attention of the passer-by is attracted to the show window, it is essential to provide conditions which will permit that undisturbed and comfortable inspection which is inducive to purchasing. The congestion of sidewalks by hurrying crowds or hot or inclement weather militates against the ideal condition which is prerequisite to purchasing. To overcome this objection to show window inspection of merchandise, a form of display vestibule has been devised. A recent and most effective construction of this kind is found in the store of The Bedell Company, New York, illustrated on this page. Apparently this feature is considered so important that approximately one third of the first floor of the store area is given over to the display vestibule on the 34th Street front. This display vestibule occupies the entire width of the store.

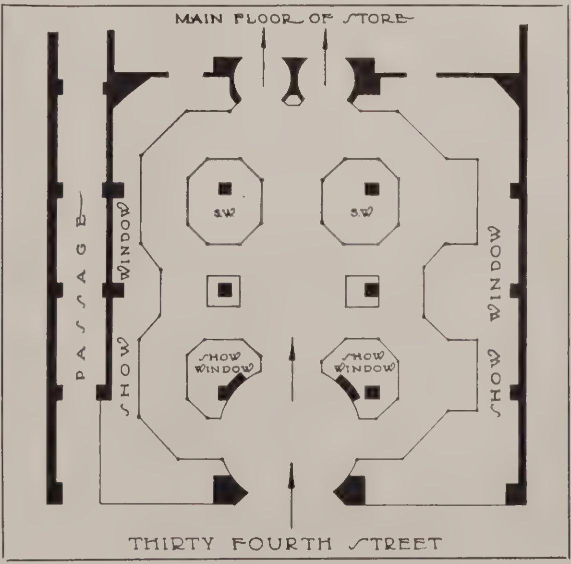
Large and very attractive show windows are placed on each side of a central, two-story entrance. Between this entrance to the display vestibule and the entrance to the store proper there is a large space which is entirely glass-enclosed. The exterior show windows are glass-enclosed on both sides. Show windows are placed along the side walls of the vestibule and along the front of the store proper. These show windows are very deep and permit the display of merchandise without crowding, giving also spaciousness that is befitting the display of beautiful merchandise. The display vestibule is brilliantly illuminated.

The alterations in this store building have corresponded with its improvements in merchandising methods and with the continuous increase in its volume of business. The first alteration of the show windows and store entrance included the removal of two first-story columns and the erection of a heavy plate girder, extending entirely across the front, to support the columns above. The girder loads were transferred to their original foundations through a load-distributing truss erected in the basement (Figs. 1 and 2). The store was widened recently by including the property adjoining on the east, and the principal feature of the recently altered front consists of a two-story entrance built in the center of the widened store and the complete rebuilding of the show windows. Equally as extensive alterations

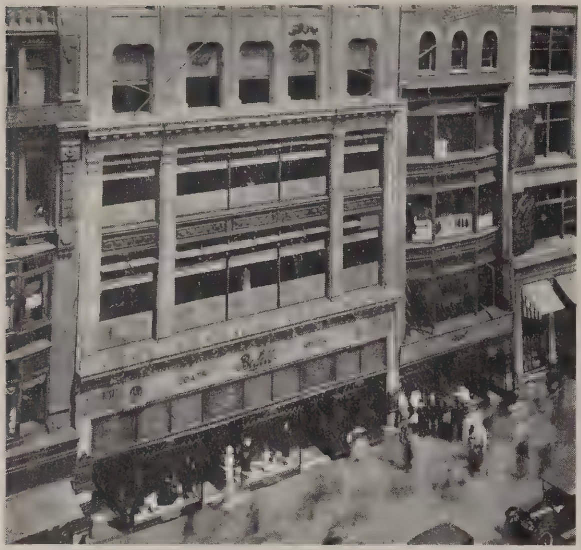


Above. New Front of the Bedell Store, New York

Designed by Joseph Urban, Architect
George A. Schonewald, Architect of the Building Alteration



Right. Plan of the shop front, showing unusual arrangement and extent of show windows. The Bedell Store, New York

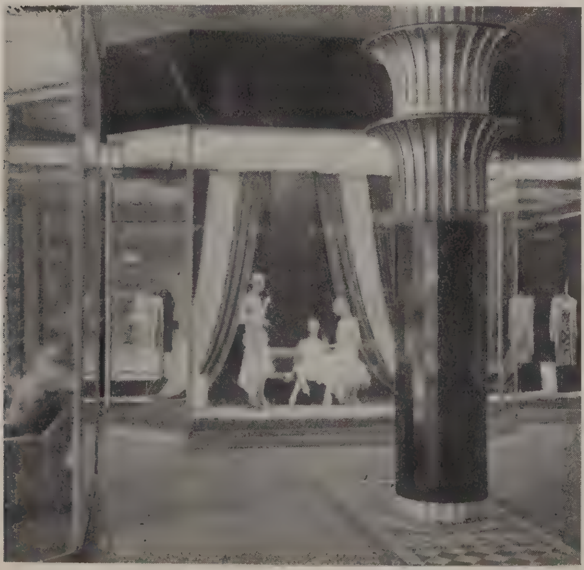


Bedell Store, New York, before Latest Alteration. The Building at the Right is Incorporated in the New Store

George A. Schonewald, Architect for the alteration
Joseph Urban, Designer of Shop Front

were made in the structural frame, in the display vestibule, and in the removal of the party walls between the two properties. The successive stages of rebuilding the structural frame of the front are indicated in the diagrams upon this page.

The architectural transformation of this store in its various stages illustrates the ability of the structural engineer to perform the "structural surgery," if one pleases, to make it possible to execute the architectural design regardless of its form and at the same time retain the stability of the structure. George A. Schonewald was the architect for the building alterations; Joseph Urban designed the shop front, and Elwyn E. Seelye was structural engineer for the operation.



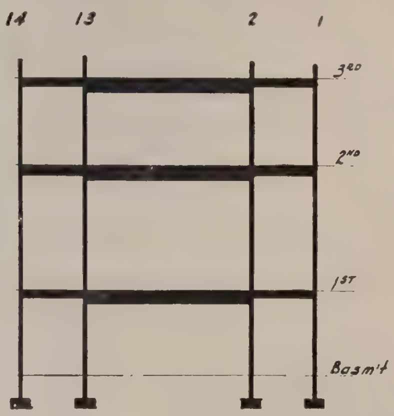


Fig. 1. The original structural steel frame

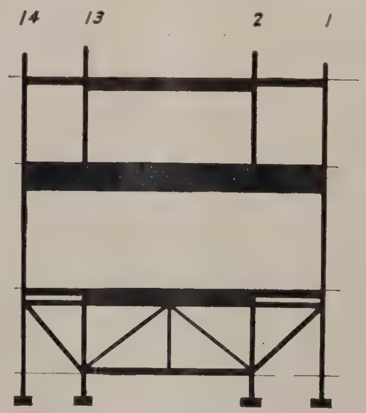


Fig. 2. The large girder and the inverted truss were necessary to accommodate the wide show front shown at the upper left corner of this page

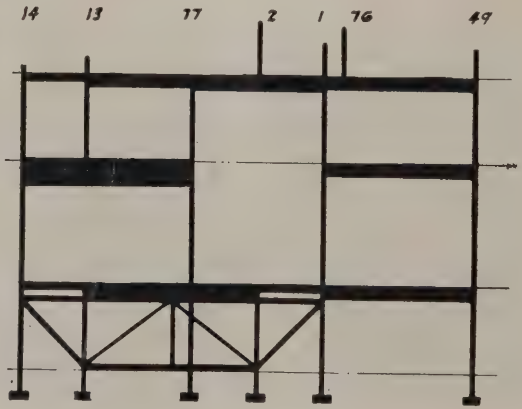


Fig. 3. The alterations in the structural frame shown here were to accommodate the new shop front shown on the preceding page

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